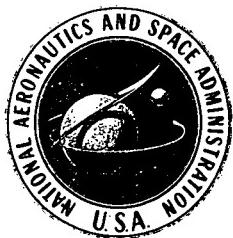


NASA SP-7011(115)

N73-27051



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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
WITH INDEXES
(Supplement 115)

MAY 1973

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 115)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in April 1973 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*.



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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 324 reports, articles and other documents announced during April 1973 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

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All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

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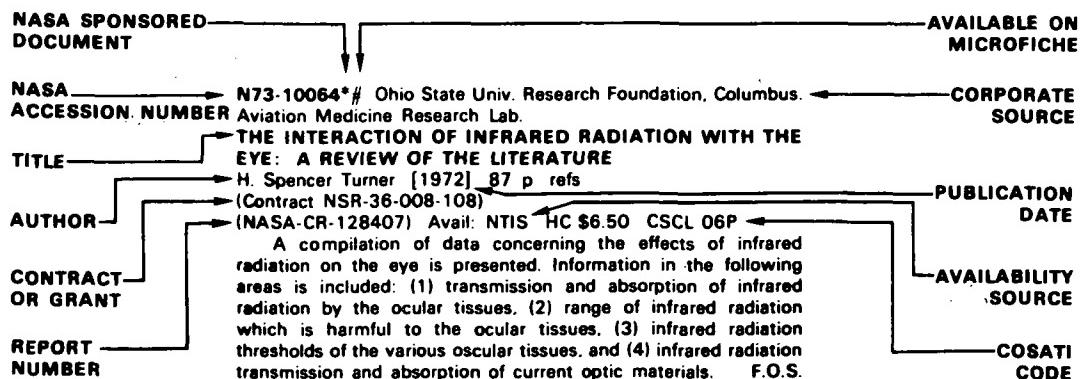
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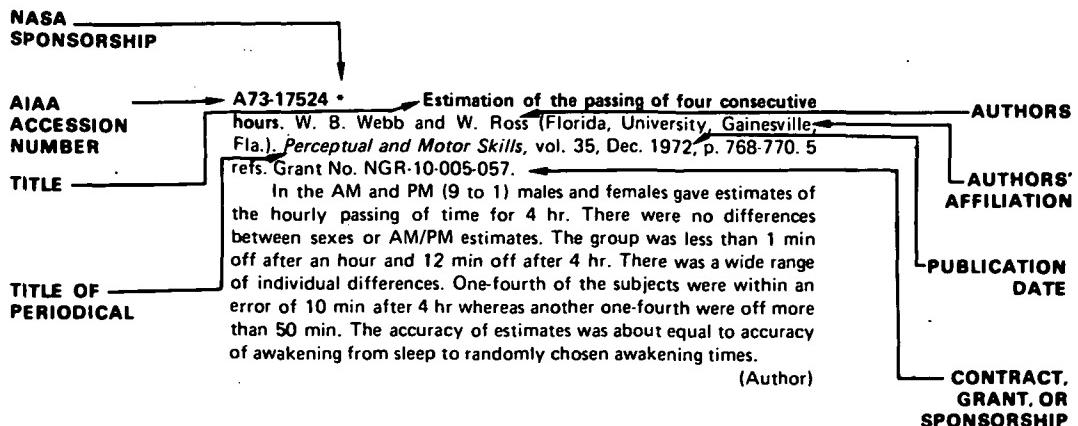
TABLE OF CONTENTS

	Page
IAA Entries (A73-10000)	115
STAR Entries (N73-10000)	133
Subject Index	I-1
Personal Author Index	I-35

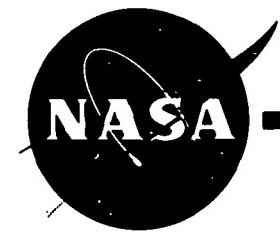
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TYPICAL CITATION AND ABSTRACT FROM IAA



AEROSPACE MEDICINE AND BIOLOGY



A Continuing Bibliography (Suppl. 115)

MAY 1973

IAA ENTRIES

A73-18949 Protective clothing for fueling personnel (Les vêtements de sécurité pour ergoliers). R. Maidon (Etudes et Fabrications Aéronautiques, Clichy, Hauts-de-Seine, France). In: French space technology. Volume 1. Paris, Information Propagande Françaises, Editeur; Centre National d'Etudes Spatiales, 1971, p. 571-575. In English and French.

Description of the equipment provided for the protection of rocket-propellant handling personnel at the French Guiana Space Center. The equipment provides protection of the head against shocks, and of the skin and breathing, hearing, and sight organs against contact with propellants and their vapors. It provides also head and body ventilation, and consists of an airtight external suit and head gear, ventilated underwear, and a ventilation-air control unit. M.V.E.

A73-19111 Survival of micro-organisms on the moon: P. M. Molton (Maryland, University, College Park, Md.). *Spaceflight*, vol. 15, Feb. 1973, p. 51.

To obtain factual data on how long and under what conditions terrestrial life could survive exposure to vacuum, the entire TV camera and other selected components were removed from the Surveyor 3 spacecraft, sealed and returned to earth, stored for a quarantine period, and then disassembled and examined. Since microbial growth was shown from only a single sample, possibly from only a single microbial cell, the result is in question. Contamination by the investigators is a possibility, despite the careful approach. F.R.L.

A73-19124 The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms. D. W. Hill (Royal College of Surgeons of England, London, England), F. D. Thompson (London, University, London, England), M. E. Valentiniuzzi, and T. Pate (Baylor University, Houston, Tex.). *Medical and Biological Engineering*, vol. 11, Jan. 1973, p. 43-54. 37 refs. Grant No. PHS-HE-13114-02.

A73-19125 Linearity of the horizontal component of the electro-oculogram. L. A. Geddes, J. D. Bourland (Baylor University, Houston, Tex.), R. Steinberg (Rice University, Houston, Tex.), and G. Wise (Princeton University, Princeton, N.J.). *Medical and Biological Engineering*, vol. 11, Jan. 1973, p. 73-77. 16 refs. U.S. Department of Health, Education, and Welfare Grant No. FB-00044; Grant No. NIH-TI-HE-0512S.

Study of the horizontal component of the human electro-oculogram recorded by means of dry electrodes. An analysis of the voltages obtained for gaze angles up to plus or minus 60 deg indicates

that up to about plus or minus 45 deg the linear and sinusoidal relationships of potential to eye position accurately represented the data. For gaze angles greater than plus or minus 45 deg, the sinusoidal relationship provided a slightly better fit for the data.

M.V.E.

A73-19151 Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. F. Z. Meerson, O. A. Gomzakov, and M. V. Shimkovich (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *American Journal of Cardiology*, vol. 31, Jan. 1973, p. 30-34. 26 refs.

Adaptation to high altitude hypoxia reduces the mortality rate in rats with a ligated coronary artery by 5 or 6 times and the size of ischemic necrosis by 35 percent. This adaptation also minimizes the disturbances of the heart's contractile function in ischemic myocardial necrosis. The deficit in the contractile force during maximal load on the heart is 4.4 times smaller in rats adapted to hypoxia than in rats not so adapted. The primary factor contributing to the preventive effect of adaptation to high altitude hypoxia in ischemic necrosis is an increased capacity of the oxygen transport and utilization (mitochondrial) systems in the heart muscle of the adapted animals. (Author)

A73-19152 Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches. N. El-Sherif (Cairo University, Cairo, Egypt). *American Journal of Cardiology*, vol. 31, Jan. 1973, p. 71-77. 28 refs.

Analysis of the electrocardiograms of a patient with ischemic heart disease and intermittent trifascicular block. The records revealed the multiplicity of electrophysiological mechanisms that influence impulse conduction in the bundle branch system. The value of deductive analysis in unraveling complex disturbances of the cardiac rhythm is illustrated. M.V.E.

A73-19169 * Synthesis of reverse osmosis membranes by plasma polymerization of allylamine. J. R. Hollahan and T. Wydeven (NASA, Ames Research Center, Biotechnology Div., Moffett Field, Calif.). *Science*, vol. 179, Feb. 2, 1973, p. 500, 501. 11 refs.

A73-19209 Valvular cardiopathies and tolerance to flight (Cardiopathies valvulaires et tolérance au vol). G. Leguay, J. Ille, and R. Pannier (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, Yvelines, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 3rd Quarter, 1972, p. 133-140. 6 refs. In French.

The aptitude norms for operating aircrew require integrity of the cardiovascular apparatus, verified by clinical, X-ray, and electrocardiographic examination. Consequently, the existence of a valvulopathy can only involve definite unfitness. This unfitness is justified from the point of view of air safety and the effects of flight on the valvulopathy. Case histories of seven valvular cardiopathies discovered in military pilots are reviewed, and an attempt is made to determine their tolerance to flight. F.R.L.

A73-19210 Solar flares and the terrestrial atmosphere (Eruptions solaires et atmosphère terrestre). P. Simon (Meudon, Observatoire, Meudon, Hauts-de-Seine, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 3rd Quarter, 1972, p. 141, 142. In French.

Some comments are made on the frequency of the flare phenomenon, on the variety of physical phenomena to which it

corresponds, and on the protective effects of the terrestrial atmosphere. A brief evaluation of the frequency of events which could be of concern to the flights of the Concorde is made. There are positive indications that the next solar cycles will decrease in intensity in the fifty years to come. It can therefore be hoped that strong solar events at the Concorde flight level will be quite exceptional, i.e., that the risk run from solar flares will be less than that of accidents actually happening to subsonic aircraft.

F.R.L.

A73-19211 Cosmic radiation and research carried out on board the 001 prototype Concorde (Rayonnements cosmiques et recherches entreprises à bord du prototype 001 Concorde). R. P. Delahaye (Hôpital Bégin, Saint-Mandé, Val-de-Marne, France), R. Kaiser (Commissariat à l'Energie Atomique, Laboratoire de Physique Corpusculaire, Strasbourg, France), A. François, H. Portal (Commissariat à l'Energie Atomique, Service Technique d'Etudes et de Protection, Fontenay-aux-Roses, Hauts-de-Seine, France), and Mr. Durney (Service Mixte de Sécurité Radiologique, Monthléry, Essonne, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 3rd Quarter, 1972, p. 143-150. 6 refs. In French.

A73-19212 The influence of altitude on man (L'influence de l'altitude sur l'homme). A. Hurdato. (*Fondation Jacques Parisot, Conférence, Genève, Switzerland, May 17, 1972.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 3rd Quarter, 1972, p. 157-160. In French.

The principal characteristics of the human being born and living at high altitude are briefly enumerated. The study of the influence of altitude on man can contribute to a better understanding of the mechanisms of adaptation, genetic or acquired, which determine and control the tolerance of man to the ambient environment, as well as the physiological characteristics of 20 to 30 million people among whom these mechanisms have been modified by the action of the environment where they were born and where they live.

F.R.L.

A73-19218 * Sequence data - Magnitude and implications of some ambiguities. R. Holmquist and T. H. Jukes (California, University, Berkeley, Calif.). *Journal of Molecular Evolution*, vol. 2, Dec. 29, 1972, p. 10-16. 13 refs. Grants No. NGR-05-003-460; No. NIH-HL-11553.

A stochastic model is applied to the divergence of the horse-pig lineage from a common ancestor in terms of the alpha and beta chains of hemoglobin and fibrinopeptides. The results are compared with those based on the minimum mutation distance model of Fitch (1972). Buckwheat and cauliflower cytochrome c sequences are analyzed to demonstrate their ambiguities. A comparative analysis of evolutionary rates for various proteins of horses and pigs shows that errors of considerable magnitude are introduced by Gly and Asx ambiguities into evolutionary conclusions drawn from sequences of incompletely analyzed proteins.

V.Z.

A73-19219 De novo origin of periodic proteins. M. Ycas (New York, State University, Syracuse, N.Y.). *Journal of Molecular Evolution*, vol. 2, Dec. 29, 1972, p. 17-27. 39 refs.

Discussion of the properties and genesis of silk fibroin, collagen, glycoproteins, keratin, and protamine. It is suggested that the formation of periodic amino acid sequences in the structures of these proteins is a more plausible type of their genesis than the amino acid replacements and nonperiodic DNA duplications suggested by other hypotheses. Evidence is also given for the formation of these proteins in a single evolutionary event by an iterative de novo synthesis of DNA.

V.Z.

A73-19220 Base composition of ribosomal RNA and evolution. P. A. Lava-Sánchez, F. Amaldi, and A. La Posta (CNR, Centro di Studio per gli Acidi Nucleici, Rome, Italy). *Journal of Molecular Evolution*, vol. 2, Dec. 29, 1972, p. 44-55. 29 refs.

Base composition analysis has been carried out for the two major ribosomal RNA components extracted from ribosomes of

plants and animals of various taxonomic position. The high degree of change undergone by these molecules during evolution is evident from the results obtained. Moreover, the evolutionary pattern of the rRNA base composition well reflects the phylogenetic relationships of the various taxonomic groups.

(Author)

A73-19297 # Emotional stresses during a space flight (Emotsional'noe napriazhenie v kosmicheskem polete). L. Khachatur'iants and L. Grimak. *Aviatsia i Kosmonavtika*, no. 11, 1972, p. 33, 34. In Russian.

Discussion of the emotional state of Soviet astronauts Leonov, Beliaev, Yeliseev, and Khrunov during the execution of their space assignments. Their professional reactions, heart beat and respiration rates, blood pressure fluctuations, and speech intonation spectral variations are used as the criteria, noting the unavoidability of emotions during space flight activity.

V.Z.

A73-19425 # Tissue oxygen in the presence of extremal flight factors (Kislorod tkanei pri ekstremal'nykh faktorakh poleta). E. A. Kovalenko and I. N. Cherniakov. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 21), 1972. 264 p. 628 refs. In Russian.

Description of experiments designed to study variations in brain-tissue oxygen tension under the action of certain extremal factors characterizing flight in space and in the stratosphere. The factors considered include changes in the composition of the inspired atmosphere, extremely low atmospheric pressures, and the effects of accelerations. Brain-tissue oxygen tension was also used to evaluate the effectiveness of various technical, pharmacological, and physical countermeasures against hypoxia. Mechanisms responsible for the development of hypoxic states resulting from the flight factors are discussed in detail.

T.M.

A73-19475 # Adenonucleotides, NAD+, and NADN in skeletal muscles during intensive work and at rest (Adenin-nukleotidy, NAD+ i NADN v skeletnykh myshtsakh pri intensivnoi rabote i v period otdykhha). N. R. Chagovets (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Akademija Nauk SSSR, Doklady*, vol. 207, Nov. 21, 1972, p. 739-741. 19 refs. In Russian.

Experimental study on male rats of the changes occurring in NAD+ and NADN content in skeletal muscles during intense activity and in periods of rest. The obtained results shed light on the nature of the processes determining the NAD system condition in muscle-tissue cells under various functional states of the organism.

M.V.E.

A73-19476 Inhibition of the adrenocortical response to hypoxia by dexamethasone. S. F. Marotta, L. J. Malasanos, and U. Boonayathap (Illinois, University, Chicago, Ill.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 1-4. 29 refs. Navy-supported research. NR Project 101-580.

A73-19477 Predictions of the dynamic response of the lung. G. J. Trezek (California, University, Berkeley, Calif.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 8-13. 6 refs. Research supported by the University of California; Grant No. PHS-NS-08236-03.

A73-19478 Seat reaction direction in an animal centrifuge. D. J. Shippy and T. R. Robe (Kentucky, University, Lexington, Ky.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 22-26.

A73-19479 # Human endocrine-metabolic responses to graded oxygen pressures. H. B. Hale, E. W. Williams, and J. P. Ellis, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 33-36. 21 refs.

A73-19480 Disorienting effects of aircraft catapult launchings. M. N. Cohen, R. J. Crosbie, and L. H. Blackburn (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 37-39. 12 refs. Navy-supported research. Navy Project ZR01101-01; Navy Task MF12,524,015.

A73-19481 * Thermal protective garment using independent regional control of coolant temperature. A. Shitzer, J. C. Chato, and B. A. Hertig (Illinois, University, Urbana, Ill.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 49-59. 15 refs. Grant No. NGR-14-005-103.

A73-19482 Modulated light transmission for electrical isolation in a multichannel physiological monitoring system. D. G. Forgays, G. McClure, and F. C. Evering, Jr. (Vermont, University, Burlington, Vt.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 68-70. 8 refs. Contract No. F44620-69-C.

A73-19483 Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria. O. R. Brown and D. Peterson (Missouri, University, Columbia, Mo.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 71-73. 7 refs. Contract No. N00014-67-A-0287-0002.

A73-19484 Civil aviation medicine in the coming decade. C. R. Harper (Aviation Insurance Agency, Inc., Atlanta, Ga.). (*International Congress of Aviation and Space Medicine, 19th, Tel Aviv, Israel, Oct. 25-29, 1971.*) *Aerospace Medicine*, vol. 44, Jan. 1973, p. 74-77. 5 refs.

A73-19485 Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn. R. D. Gilson, F. E. Guedry, Jr., W. C. Hixson, and J. I. Niven (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aerospace Medicine*, vol. 44, Jan. 1973, p. 90-92. Army-Navy-sponsored research.

A73-19500 * Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria. G. A. Tomlinson (Santa Clara, University, Santa Clara, Calif.) and L. I. Hochstein (NASA, Ames Research Center, Moffett Field, Calif.). *Canadian Journal of Microbiology*, vol. 18, no. 12, 1972, p. 1973-1976. 11 refs. NASA Grant No. SCC-101.

A73-19548 Response strategies with a cross-coupled control system. P. McLeod (Medical Research Council, Applied Psychology Unit, Cambridge, England). *Journal of Experimental Psychology*, vol. 97, Jan. 1973, p. 64-69. 5 refs.

A cross-coupled control system is one in which there is an angular disparity between the frames of reference of the control and the controlled object. Naval enlisted men performed a pursuit tracking task, with a lagged rate control, in which the cross-coupling (c-c) angle varied sinusoidally with time. Separate groups of six subjects tracked with different combinations of maximum c-c angle and sinusoidal frequency. For some groups the c-c angle was displayed visually. Performance was dependent on maximum c-c angle and independent of rate of change of c-c angle. The results were predicted with an error of less than 5% by a model which assumed that subjects adopted a heuristic response strategy which ignored the value of the c-c angle. The results would not be predicted by any model which assumed that subjects' individual responses are related to the input. A successful model would have to assume that only the sum of responses integrated over time was related to the desired result. (Author)

A73-19549 Autokinetic movement as a function of the implied movement of target shape. C. R. Borresen (Wichita State

University, Wichita, Kan.). *Journal of Experimental Psychology*, vol. 97, Jan. 1973, p. 89-92. 6 refs.

A range of meaningful target shapes varying from high- to low-implied movement was used in an autokinetic movement task: a rocket, car, face, tree, lamp, and building. Direction of movement and latency of response were the data collected. As predicted, target shapes with high-implied movement in a given direction had a significant number of reported movements in that direction. Target shapes with low-implied movement did not have significantly different directional response frequencies. In addition, response latencies were shorter for high-implied movement target shapes than for low-implied movement target shapes, but not only with respect to the direction of implied movement. (Author)

A73-19643 # Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress (Izmenenia funktsional'nogo sostoianiya dvuglavoi myshtsy plecha cheloveka pod vliyaniem utomitel'noi fizicheskoi nagruzki). L. Z. Lautsevichus, M. A. Chobotas, and I. S. Saplinskas (Ministerstvo Zdravookhraneniia Litovskoi SSR, Institut Eksperimental'noi i Klinicheskoi Meditsiny; Vil'niusskii Gosudarstvennyi Universitet, Vil'nius, Lithuanian SSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 6-9. 11 refs. In Russian.

A73-19644 # Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress (Rol' adrenalina i vyklucheniia alpha-retseptorov v reaktsiakh organov krovetvoreniia na stress). P. D. Gorizontov, O. I. Belousova, and Iu. I. Zimin. *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 23-26. 15 refs. In Russian.

A73-19645 # Mediator systems and respiratory function during an acute lethal loss of blood (Mediatornye sistemy i funktsii dykhaniia pri ostroii smertel'noi kropotere). G. Ia. Bazarevich, A. O. Likhtenstein, M. Kh. Sadekov, G. V. Maslen, and A. K. Kolesnikov (Kazanskii Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii; Kazanskii Meditsinskii Institut, Kazan, USSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 32-35. 13 refs. In Russian.

Respiratory disorders were studied in 54 dogs with lethal losses of blood, in relation to cholinergic activity and blood contents of adrenalin-related substances and serotonin. Respiration was faster and deeper, with symptoms of alkalosis, in dogs showing an increased cholinergic activity and higher serotonin contents in response to a loss of blood, and was faster and sublimis, with symptoms of acidosis, in dogs developing a depression of cholinergic activity and a decrease of serotonin content after a loss of blood. V.Z.

A73-19646 # Diurnal rhythm oscillations of fat metabolism indices in healthy young men (Ritm sutochnykh kolebanii pokazatelei zhirovogo obmena u zdorovykh molodykh liudei). R. M. Zaslavskaya and K. Zh. Akhmetov (Aktiubinskii Meditsinskii Institut, Aktiubinsk, Kazakh SSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 47, 48. 12 refs. In Russian.

A73-19647 # The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies (Vliyanie dvustoronnego razrusheniia nekotorykh struktur medial'nogo gipotalamus na obrazovanie komplement-sviazvaiushchikh antitel). A. D. Ado and M. M. Gol'dshtein (Akademiiia Meditsinskikh Nauk SSR, Moscow, USSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 57-61. 12 refs. In Russian.

A73-19648 # Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning (Poisk optimal'nogo rezhima biologicheskoi konservatsii serdtsa metodami matematicheskogo planirovaniia eksperimenta). S. M. Chilaia, Ia. I. Gondzhilashvili, Z. A. Bolotashvili, and A. N. Dadiani (Ministerstvo Zdravookhraneniia Gruzinskoi SSR, Institut Eksperimental'noi i Klinicheskoi Khirurgii, Tiflis, Georgian SSR).

Bulleten' Eksperimental'noi Biologii i Meditsiny, vol. 74, Dec. 1972, p. 81-84. 7 refs. In Russian.

A73-19649 # The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture (Vliyanie temperatury na mitoticheskuiu aktivnost' linfoцитov perifericheskoi krovi cheloveka v kul'ture). P. A. Borodkin (Akademii Nauk SSSR, Institut Biologii, Syktyvkar, USSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 87, 88. In Russian.

A73-19650 # Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem (Elektronnomikroskopicheskoe issledovanie lokalizatsii sinapsov pervichnykh afferentnykh volokon v kokhlearnykh iadraakh stvola golovnogo mozga). I. L. Laziev and A. L. Mikeladze (Akademii Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 101-104. 17 refs. In Russian.

A73-19928 # Assessment of hypoxia in the human heart. R. Gorlin (Peter Bent Brigham Hospital, Boston, Mass.). (*International Society of Cardiology and World Health Organization, Symposium, Geneva, Switzerland, June 14-17, 1971.*) *Cardiology*, vol. 57, no. 1-2, 1972, p. 24-34.

Questions of the recognition of myocardial ischemia are discussed, giving particular attention to myocardial ischemia in the human heart. Ischemia exists when the energy supply is inadequate for the energy demand of the system. Metabolic changes with myocardial ischemia are considered together with the effects of electrical pacing on myocardial lactate metabolism, changes in oxygen and lactate metabolism induced by right atrial pacing, and the correlation between glucose extraction and lactate production during myocardial ischemia. G.R.

A73-19929 # The use of glycolytic metabolism in the assessment of hypoxia in human hearts. S. Gudbjarnason (University of Iceland, Reykjavik, Iceland). (*International Society of Cardiology and World Health Organization, Symposium, Geneva, Switzerland, June 14-17, 1971.*) *Cardiology*, vol. 57, no. 1-2, 1972, p. 35-46. 19 refs. Research supported by the American Medical Association.

Three criteria have often been employed to detect the presence of anaerobic metabolism whose development has been used as a sign for myocardial hypoxia and ischemia in the intact heart. The three criteria include the diminution in myocardial lactate extraction, the release of lactate into the coronary sinus blood, and the increase in the lactate/pyruvate ratio of blood perfusing the heart muscle. An attempt is made to illustrate that none of these criteria appears to be adequate to be used as a sole diagnostic tool to demonstrate the presence of myocardial hypoxia. G.R.

A73-19930 # Orthogonal versus planar vector-electrocardiography. P. J. Ioannidis, D. Lekos, and E. J. Ioannidis (Hippocration Hospital, Athens, Greece). *Cardiology*, vol. 57, no. 3, 1972, p. 150-161. 10 refs.

Combinations of projection data from a vector cardiogram and orthogonal EKGs are used to determine the spherical coordinates of instantaneous vectors as a basis for quantitation of the three-dimensional forces generated during an electric cardiac cycle. The various techniques used in the process are compared and a more convenient one is indicated. V.Z.

A73-19931 # The contractile function of the myocardium in two types of cardiac adaptation to a chronic load. F. Z. Meerson and V. I. Kapelko (Akademii Nauk Meditsinskikh Nauk SSSR, Moscow, USSR). *Cardiology*, vol. 57, no. 4, 1972, p. 183-199. 37 refs.

After 15-18 months of experimental coarctation of the aorta, the weight of the rat left ventricle increased by 94%. Papillary muscle

strips developed 46% less tension than strips of the same thickness from control hearts. The average rate of tension development was 53% below controls. Strips from hypertrophied hearts featured three characteristics probably associated with impairment of excitation-contraction coupling, namely a decreasing ability to respond to high-stimulation frequency, a decrease in the degree of potentiation by paired pulse stimulation, and an increase in the extent of incomplete relaxation at high-contraction rate as compared to controls. After 6-7 weeks of adaptation to high-altitude hypoxia, the rat papillary muscle strips taken from non-hypertrophied left ventricle developed 30% more tension than strips of the same thickness from control hearts. (Author)

A73-19932 * # The influence of recording speed on apex-cardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. V. M. Pigott (Lemuel Shattuck Hospital, Boston, Mass.), D. H. Spodick (Lemuel Shattuck Hospital; Boston University, Boston; Tufts University, Medford, Mass.), R. Ryan-Platt, and E. Elber. *Cardiology*, vol. 57, no. 4, 1972, p. 232-239. 11 refs. Grant No. NGR-22-012-006.

A73-20001 # Evolution of the neuron systems of suprasegmental motor control /Review/ (Evoliutsiya neironnykh sistem nadsegmentarnogo motornogo kontrolla /Obzor/). A. I. Shapovalov (Akademii Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Neirofiziologija*, vol. 4, Sept.-Oct. 1972, p. 453-470. 51 refs. In Russian.

Published studies of supraspinal motor control systems are discussed to demonstrate that a number of key characteristics of reticulomotor neuron projections are preserved through the Cyclostomata-Primates evolution series. The topics also include truncus projections in various vertebrates and cortical motor neuron control in mammals. V.Z.

A73-20002 # Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculus of the cat spinal cord (Kortiko- i rubrofugal'naya aktivatsiya interneuronov, obrazuushchikh propriospinal'nye puti dorsolateral'nogo kanatika spinnogo mozga koshki). D. A. Vasilenko, A. I. Kostukov, and A. I. Pilavskii (Akademii Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologija*, vol. 4, Sept.-Oct. 1972, p. 489-500. 41 refs. In Russian.

A73-20003 # Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents (O funktsional'noi organizatsii mekhanizmov presinapticheskogo tormozheniya, vyzvannogo razdrazheniem kozhnykh afferentov). P. E. Motnyi, T. F. Dneprovskaya, and V. V. Ogorodnik (Dnepropetrovskii Gosudarstvennyi Universitet, Dnepropetrovsk, Ukrainian SSR). *Neirofiziologija*, vol. 4, Sept.-Oct. 1972, p. 510-515. 13 refs. In Russian.

A73-20004 # Changes in the amplitudinal and temporal characteristics of somatomotor-cortex evoked potentials after deactivation of spinocervical tracts in cats (Izmenenie amplitudnykh i vremennykh kharakteristik vyzvannykh potentsialov senso-motornoi kory posle vyklucheniia spino-tservikal'nykh traktov u koshek). N. I. Nezlin (Akademii Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Neirofiziologija*, vol. 4, Sept.-Oct. 1972, p. 516-523. 11 refs. In Russian.

A73-20005 # Participation of hippocampal neurons in theta-wave generation (Uchastie neuronov gippokampa v generatsii teta-voln). D. P. Artemenko (Akademii Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologija*, vol. 4, Sept.-Oct. 1972, p. 531-539. 26 refs. In Russian.

Temporal relations between hippocampal neuron activity and theta-wave phases were studied by layer-by-layer analysis of cell potentials and extracellular theta waves in nonanesthetized tubo-

curized rabbits. Most discharges in hippocampal neurons were synchronous with extracellular theta-waves. Most of the more numerous pyramidal cells were excited during a positive theta-wave phase while the less numerous basket cells were activated predominantly during a negative theta-wave phase. It is theorized on the basis of these findings that the IPSPs of pyramidal cells play a key role in the generation of intracellular theta-rhythms.

V.Z.

A73-20006 # Physiological mechanisms of evoked-potential habituation in the visual analyzer (Fiziologicheskie mehanizmy 'privykanii' vyzvannyykh potentsialov v zritel'nom analizatore). R. F. Makul'kin and Iu. F. Pedanov (Odesskii Gosudarstvennyi Meditsinskii Institut, Odessa, Ukrainian SSR). *Neirofiziologija*, vol. 4, Sept.-Oct. 1972, p. 540-544. 28 refs. In Russian.

Experiments on cats with total surgical immobilization of the reticular formation showed inhibition of the habituation of evoked potentials in the primary visual projection zone and in the corpus geniculatum laterale. Habituation of evoked visual potentials was also observed in post-trigeminal preparations. It is theorized that the tonic impedance portion of the reticular formation plays an important role in the development of habituation.

V.Z.

A73-20026 * Survival of Arthrobacter crystallopictes during prolonged periods of extreme desiccation. C. W. Boylen (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.). *Journal of Bacteriology*, vol. 113, Jan. 1973, p. 33-37. 16 refs.

A73-20027 * Spin-labeling studies on the membrane of a facultative thermophilic bacillus. M. Chan, Y. P. Virmani, R. H. Himes, and J. M. Akagi (Kansas University, Lawrence, Kan.). *Journal of Bacteriology*, vol. 113, Jan. 1973, p. 322-328. 18 refs. Grant No. NSG-17-002-042.

A73-20033 Stress recovery of human tendons after relief - Mechanical recovery (Spannungsrückgewinn menschlicher Sehnen nach Entlastung - Mechanische Erholungseigenschaft). W. Worthmann, G. Arnold, and H. Lippert (Hannover, Medizinische Hochschule, Hanover, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 2, 1973, p. 77-88. 19 refs. In German. Research supported by the Stiftung Volkswagenwerk.

An investigation was conducted to study the relation between stress recovery and load removal rate. The dependence of stress recovery on the magnitude of the previously applied load was also investigated. The investigations were carried out with 127 human tendons. The influence of age was studied with the aid of a linear regression method. The underlying causes for the observed smaller stress recovery in the case of tendons from females are discussed, together with differences of stress recovery of tendons from the right and the left side of the human body. The relaxation characteristics of human tendons were also explored.

G.R.

A73-20034 Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise (Untersuchungen zur Koordination von Herzschlag- und Atemfrequenz /Puls-Atem-Quotient/ bei dynamischer Arbeit). D. Bräuer, G. Küchler, and I. Wolburg (Deutsches Zentralinstitut für Arbeitsmedizin, Berlin, East Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 2, 1973, p. 89-102. 21 refs. In German.

The investigations take into account differences between males and females, experimental phases, questions of the reproducibility of the mean pulse-respiration quotient, and the stability of the mean pulse-respiration quotient. Some typical variations of the mean pulse-respiration quotient in the case of certain experimental phases are explored. Sequences of the pulse-respiration quotient obtained for one subject during the phases of an experiment are presented in a graph. Data regarding groups and individual subjects are provided.

G.R.

A73-20035 A respirometer for the continuous measurement of respiration volume with remote transmission (Ein Respirometer für die kontinuierliche Messung des Atemvolumens mit Fernübertragung). V. Hanusova (Ustav Hygieny Prace a Chorob z Povolani, Prague, Czechoslovakia). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 2, 1973, p. 141-150. 17 refs. In German.

Significant features of the new instrument include small physical dimensions, great measurement accuracy, a telemetric transmission of the measured values, and a convenient approach for recording the test data during short-term and long-term tests. The principles of operation for the device are discussed, together with the technical parameters and questions regarding the calibration of the instrument. The respirometer can be used for laboratory studies and for investigations involving persons at their place of work.

G.R.

A73-20036 A method for chronocyclographical motion analysis with the aid of an on-line computer (Eine Methode zur chronozyklographischen Bewegungsaufzeichnung mit einem Prozessrechner). V. Güth, F. Abbiink, and W. Heinrichs (Orthopädische Universitätsklinik und Poliklinik, Münster, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 2, 1973, p. 151-162. 6 refs. In German. Research supported by the Bundesministerium für Jugend, Familie und Gesundheit und Deutsche Forschungsgemeinschaft.

Photodiodes are attached to the subject whose motions are to be studied. A light pattern is periodically projected on the subject with the aid of a rotating mirror. The electric pulse pattern obtained as a result of the exposure of the photodiodes to the projected light is analyzed by a computer for an evaluation of the motion made by the subject. The optical system used is discussed together with the electronic equipment, the computer program required, and questions concerning the estimation of the maximum error.

G.R.

A73-20047 # Application of the perceptron to the classification of objects according to random features (Zastosuvannia perseptronu dla razpolodil ob'ekti na klasi za vypadkovimi oznakami). O. B. Glaz and L. A. Rastrigin. *Avtomatika*, vol. 17, July-Aug. 1972, p. 19-26. 6 refs. In Ukrainian.

The logical synthesis of an automaton that reacts differently to different classes of objects is examined along with perceptron learning processes in an attempt at comparing these two approaches to the problem of classification according to initially unknown features. The number of associative elements in real perceptrons is always limited, and as a consequence, the characteristics of perceptrons with an initial random structure of relationships prove to be far from optimal. The present work proposes a perceptron with an adaptive structure of relationships between the 'retina' and the associative elements. Due to the multivariable nature of this structure, random search techniques are used for its adaptation in the learning process.

T.M.

A73-20048 # An ergatic organism (Ergatichnii organizm). V. V. Pavlov. *Avtomatika*, vol. 17, July-Aug. 1972, p. 42-47. 5 refs. In Ukrainian.

An ergatic organism is defined as a multipurpose non-autonomous system which (under varying ambient conditions) exhibits the property of generalized homeostasis with respect to conservation of all functional operations required to achieve a given goal. The structural features of such a system are analyzed, and the organization of the controller is described on heuristic, conditioned-reflex, unconditioned-reflex, centralized, and decentralized levels.

T.M.

A73-20123 Inter-hemispheric transfer of meaningful visual information in normal human subjects. K. M. Kleinman and R. W. Little (Southern Illinois University, Edwardsville, Ill.). *Nature*, vol. 241, Jan. 5, 1973, p. 55-57. 6 refs. Research supported by the Southern Illinois University.

Two studies were conducted to determine whether stimulus association value affects visual recognition under conditions of

A73-20159

successive exposure in the same or opposite visual field. The data obtained indicate that visual information of low association value, when projected to one cerebral hemisphere, does not readily traverse the corpus callosum. Visual information of high association value is apparently more readily transmitted between hemispheres. G.R.

A73-20159 Feature detectors and vernier acuity. J. M. Findlay (Durham, University, Durham, England). *Nature*, vol. 241, Jan. 12, 1973, p. 135-137. 18 refs.

Theories regarding the factors related to the accuracy obtainable in a vernier alignment task have concentrated on the problem of locating the position of the retinal image of one of the lines to the requisite accuracy. Two explanations have been proposed. An alternative hypothesis is suggested by some results obtained in recent work on the visual system. In order to test the hypothesis, the effect of a high contrast grating background on a vernier acuity task was determined as the angle between target and background was varied.

G.R.

A73-20168 Time course of pulmonary vascular response to hypoxia in dogs. A. B. Malik (Hospital of Sick Children, Toronto, Canada) and B. S. L. Kidd (Toronto, University, Toronto, Canada). *American Journal of Physiology*, vol. 224, Jan. 1973, p. 1-6. 22 refs. Research supported by the Medical Research Council of Canada.

The possible role of sympathetic mechanisms in mediating the integrated pulmonary vascular response to hypoxia was investigated by determinations of the time course of the response during alpha- or beta-adrenergic blockade. Adrenergic mechanisms are found to be involved in decreasing the hypoxia-induced rise in pulmonary vascular resistance to control levels during the development of respiratory alkalosis. M.V.E.

A73-20169 * Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. G. L. Anderson, G. E. Resch, and X. J. Musacchia (Missouri, University, Columbia, Mo.). *American Journal of Physiology*, vol. 224, Jan. 1973, p. 144-147. 15 refs. Grant No. NGL-26-004-021.

Investigation of the effect of hypoxia on the depletion of metabolites that occurs in helium-aided induction of hypothermia. Hypoxic slowing of the heart of a hamster while exposed to cold heliox is demonstrated. An attempt is made to evaluate the relative importance of cardiac slowing and limitation of thermogenesis in determining the effect of hypoxia. In explanation of the results presented, it is suggested that hypoxia limits the energy expenditure by the heart during induction. M.V.E.

A73-20170 * Effect of low temperature on metabolism of rat liver slices and epididymal fat pads. L. A. Hillyard and C. Entenman (Institute for Lipid Research, Berkeley, Calif.). *American Journal of Physiology*, vol. 224, Jan. 1973, p. 148-153. 27 refs. Grant No. NGR-05-005-035.

Study of low temperature effects on the metabolism of radioisotope-tagged glucose and palmitate in rat liver slices and epididymal fat pads. The obtained data suggest that the oxidative capacity of rat liver and adipose tissue is maintained at low temperatures to a greater degree than the synthetic capacity. It was concluded that sufficient energy can be produced at 17°C for maintenance of essential tissue functions by these two tissues but that the energy requirements may not be met at 7°C. M.V.E.

A73-20251 Color naming and hue discrimination in congenital tritanopia and tritanomaly. D. P. Smith (Melbourne, University, Melbourne, Australia). *Vision Research*, vol. 13, Feb. 1973, p. 209-218. 30 refs.

A73-20252 Human receptive field characteristics - Probe analysis of stabilized images. D. R. Brown, M. J. Schmidt, D. D. Fulgham, and M. P. Cosgrove (Purdue University, Lafayette, Ind.). *Vision Research*, vol. 13, Feb. 1973, p. 231-244. 26 refs. Grant No. NIH-HD-00909.

The investigations discussed provide data for a single unit characteristic which has been extensively studied by electrophysiological techniques. Further evidence is provided concerning both orientation and area sensitivity in the case of stabilized image techniques. The data obtained demonstrate clearly that a faded stabilized image creates an adapted area in the visual field. Some of the spatial and temporal characteristics of this adaptation were examined with the aid of a probe detection paradigm. It was found that line length apparently plays a critical role in creating a substantial increase in adaptation strength around the edges of some line stimuli. G.R.

A73-20253 Dynamic properties of vision. III - Twin flashes, single flashes and flickerfusion. J. A. J. Roufs (Instituut voor Perceptie Onderzoek, Eindhoven, Netherlands). *Vision Research*, vol. 13, Feb. 1973, p. 309-323. 22 refs.

Threshold determinations for flashes and harmonically modulated light showed that the characteristic values both for sensitivity and for inertia have a close relationship at background levels ranging over 5 decades. The results obtained with short double flashes are discussed. It is found that the shape of the characteristics, representing on a double-logarithmic scale the threshold intensity of two short identical incremental flashes as a function of the interval between them, is practically identical for various background levels. G.R.

A73-20254 Spatial summation in color-receptive pathways. I. Rentschler (München, Universität, Munich, West Germany). *Vision Research*, vol. 13, Feb. 1973, p. 325-336. 23 refs. Research supported by the Deutsche Forschungsgemeinschaft.

An experiment was performed to investigate the effect of the stimulus pattern on the interaction of spatial summation units in color-receptive pathways. Aspects of spatial summation were studied by measuring color discrimination with equiluminant bipartite fields. The effect of various parameters on the color discrimination threshold was investigated. These parameters include color, width of the color gradient, retinal illumination, and field size. G.R.

A73-20255 A theory of the Müller-Lyer illusion. C. Chiang (Academia Sinica, Institute of Physics, Taipei, Nationalist China). *Vision Research*, vol. 13, Feb. 1973, p. 347-353. 21 refs.

The theory presented provides a mechanism by which aspects of the angle contour give rise to the illusion. The theory may also be used to explain other forms of the Müller-Lyer illusion. A number of variations of the Müller-Lyer illusion are presented in a table. The theory makes use of the concept of the 'field of attention' and the probability distribution of perception to explain the illusion. G.R.

A73-20256 The masking of apparent motion in random-dot patterns. O. Braddick (Cambridge University, Cambridge, England). *Vision Research*, vol. 13, Feb. 1973, p. 355-369. 22 refs.

The limiting inter-stimulus interval (ISI) for disappearance of a moving square was determined with the interval dark and also with a uniform bright field exposed throughout the interval. The introduction of the uniform bright field greatly reduces the maximum ISI at which the moving square can be seen. There is a range of ISI's from about 30 to 80 msec for which the movement is clearly visible with a dark ISI but invisible with the bright field. This can be described as a masking of the apparent movement by the bright field. The exposure of a pattern in the ISI is considered together with the relative luminance of patterns and ISI, effects of mean luminance, and the effect of pattern contrast. G.R.

A73-20257 Brightness and equivalent intensity of intrinsic light. L. E. Marks (John B. Pierce Foundation, New York, N.Y.; Yale University, New Haven, Conn.). *Vision Research*, vol. 13, Feb. 1973, p. 371-382. 40 refs. Grant No. AF-AFOSR-70-1950.

A major objective of the study conducted was to evaluate directly the brightness of intrinsic light. Subjects gave numerical estimates of the brightness aroused by various intensities of light presented to the foveal and peripheral retina, relative to the

brightness of intrinsic light. Each subject judged the brightness of test stimuli in proportion to the appearance of his visual field in the dark. The results provided a measure of the brightness of intrinsic light with respect to brightnesses produced by various intensities of photopic and scotopic stimuli. G.R.

A73-20258 In search of the neural channel which codes real light and equivalent backgrounds. J. T. Danielson (Massachusetts, University, Amherst, Mass.). *Vision Research*, vol. 13, Feb. 1973, p. 383-391. 26 refs. Research supported by the University of Massachusetts; NSF Grant No. GB-28188.

The sensitivity of the visual system to test flashes under bleaching adaptation and field adaptation conditions is determined. Four dutch rabbits with chronically implanted bipolar electrodes were used in the experiments. The increment sensitivity relation obtained for bleaching adaptation states and real light backgrounds is presented in a graph. Most of the recovery of sensitivity due to bleaching dark adaptation is over by 20 min, but even at 20 min the system is not entirely recovered. G.R.

A73-20259 Two dimensional eye movement recording using a photo-electric matrix method. R. Jones (Ohio State University, Columbus, Ohio). *Vision Research*, vol. 13, Feb. 1973, p. 425-431. 5 refs. Research supported by the Illuminating Engineering Research Institute.

A73-20260 The effects of electrical stimulation of the eye upon increment threshold for square-wave gratings. J. G. May (Louisiana State University, New Orleans, La.). *Vision Research*, vol. 13, Feb. 1973, p. 433-441. 27 refs.

A73-20261 Chromatic rod vision. IX - A theoretical survey. B. Stabell and U. Stabell (Oslo, Universitetet, Oslo, Norway). *Vision Research*, vol. 13, Feb. 1973, p. 449-455. 56 refs. Research supported by the Norges Almenvitenskapelige Forskningsrad.

Evidence supporting the hypothesis that rods and cones may interact to produce sensation of hue is considered. There seems to be well-founded evidence in favor of the assumption that scotopic contrast hue results from interaction between cone and rod activities and, therefore, probably originates centrally to the photochemical systems of the receptors. Consequently, the photochemical explanation of scotopic contrast hue may be excluded. Furthermore, the evidence appears to contradict the prevailing hypothesis of independence between rod and cone activities suggested by Hecht (1937) and Westheimer (1970). G.R.

A73-20262 Monocular and binocular aspects of apparent movement. A. R. Hill and H. C. Yorke (University of Aston, Birmingham, England). *Vision Research*, vol. 13, Feb. 1973, p. 467-475. 16 refs.

The experiment reported demonstrates clearly the existence of a distinction between the temporal integrational characteristics of the monocular as opposed to binocular visual systems. It is quite possible that, in part, this difference could be accounted for in terms of differential induction effects between the two viewing conditions. The results of an analysis of variance on threshold judgments of apparent movement are presented in a table. G.R.

A73-20263 Modified rhodopsin in the pigment epithelium. H. Shichi (National Institutes of Health, Laboratory of Vision Research, Bethesda, Md.). *Vision Research*, vol. 13, Feb. 1973, p. 477-480. 11 refs.

A73-20264 On the approximation of the optical modulation transfer function /MTF/ by analytical functions. H. Krueger and E. A. Moser (München, Technische Universität, Munich, West Germany). *Vision Research*, vol. 13, Feb. 1973, p. 493, 494. 7 refs.

A73-20265 Central component of fusional response - The effect of stimulus parameters. A. E. Kertesz (California Institute of Technology, Pasadena, Calif.). *Vision Research*, vol. 13, Feb. 1973, p. 495-499. Grants No. NIH-EY-00687; No. NIH-NS-03627.

The effect of various stimulus parameters on cyclofusional amplitude and, thus, on the extent of Panum's fusional areas is explored. The experiments were conducted in a dark room to eliminate any spatial clues in the field of view of the subject that might interfere with his cyclofusional response. The tests were designed to investigate the way in which the fusional mechanism resolves ambiguities, giving particular attention to the operation of the central pairing mechanism in the presence of noise. G.R.

A73-20266 The role of colour perception and 'pattern' recognition in stereopsis. V. S. Ramachandran, V. Madhusudhan Rao, S. Sriram, and T. R. Vidyasagar (Madras, University, Madras, India). *Vision Research*, vol. 13, Feb. 1973, p. 505-509. 7 refs.

A73-20267 Saccadic suppression in the presence of structured background. L. Mitrani, N. Iakimov, and S. Mateev (Bulgarska Akademii na Naukite, Institut po Fiziologii, Sofia, Bulgaria). *Vision Research*, vol. 13, Feb. 1973, p. 517-521.

The results obtained in the experiments described demonstrate clearly that the visual image plays an important role in saccadic suppression. It appears that there exists a special apparatus in the central nervous system which prescribes a given suppression dependent on the visual pattern. The results confirm findings by Mitrani et al. (1971) that the presence of an image as a background for a stimulus leads to elevation of the visual threshold for detection of the stimulus. G.R.

A73-20366 # Ontogenesis of cerebrospinal reflex activity (Ontogenesi reflektornoi deiatel'nosti spinnogo mozga). N. M. Iakovlev, Iu. Ia. Zakhov, and G. A. Vartanian (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 3, Oct.-Dec. 1972, p. 73-91. 125 refs. In Russian.

Review of published studies on the subject, covering spinal cord morphology, reflex arches, inhibition, intracentral interactions of reflex responses, and post-tetanic potentiation. Emphasis is placed on processes at neuron population levels and in the spinal cord as a whole. Experimental data are assessed in a context of various cerebral ontogenesis concepts. V.Z.

A73-20367 # Catecholamine exchange in the hormonal and mediator links of the sympatheticoadrenal system under stress (Obmen katekholaminov v gormonal'nym i mediatorychnym zven'iam simpatoadrenalovoy sistemy pri stresse). E. Sh. Matlina (Akademiia Nauk SSSR, Laboratoria Problem Upravleniya Funktsiami v Organizme Cheloveka i Zhivotnykh, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 3, Oct.-Dec. 1972, p. 92-130. 216 refs. In Russian.

Studies of catechol amine exchange in the adrenal glands, heart, liver and cerebrum of mammals under dynamic stresses are reviewed. It is concluded that a discharge of noradrenalin from the hypothalamus into blood and its transport into the heart are the immediate reaction to a stress. This reaction is followed by a steadily increasing adrenalin excretion into blood and adrenalin depletion in the adrenal glands, leading to a sharp adrenalin content drop in the adrenal glands, a decrease of adrenalin excretion into blood, a decrease of noradrenalin in the heart, and a decrease of catecholamine precursors in tissues. V.Z.

A73-20368 Sinus venosus atrial septal defect - Analysis of fifty cases. J. E. Davia, M. D. Cheitlin, and J. L. Bedynek (Walter Reed General Hospital, Washington, D.C.). *American Heart Journal*, vol. 85, Feb. 1973, p. 177-185. 28 refs.

Review of the results of an analysis of clinical, hemodynamic, and anatomic data from 50 cases of sinus venosus atrial septal defect (SVASD) that underwent surgery. SVASD comprised 12 per cent of ASDs over a 12 year period. At surgery, a persistent left superior vena cava was present in 8 per cent. Anomalous pulmonary venous connection was found in 86 per cent. M.V.E.

A73-20369 # A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man. V. A. Y. Lindquist, R. D. Spangler, and S. G. Blount; Jr. (Colorado, University, Denver, Colo.). *American Heart Journal*, vol. 85, Feb. 1973, p. 227-236. 25 refs. Research supported by the Colorado Heart Association.

A73-20374 # Information processing in the visual system. W. von Seelen. *Battelle Information* (Frankfurt), Nov. 1972, p. 13-19. 6 refs.

An evaluation of the structures of the most complex of all existing information processing systems, the central nervous system of primates, is attempted with the aim of investigating the applicability of these structures to nonbiological processes. The information gained in investigations of information processing by such a sensory subsystem as the visual system is shown to provide detailed information on the function of the whole sensory and motor cortex of the brain. Using the visual system as an example, several features of nervous information processes are discussed. Complete technological simulation of the biological system is certainly impossible, but specific functional principles underlying the biological system might provide solutions to technological problems. M.V.E.

A73-20388 # Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modularity (Arbeitsphysiologische Untersuchungen zur Objektivierung des Trackingverhaltens und mentaler Beanspruchung sowie deren psychopharmakologischen Modulierbarkeit). H. Strasser. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1972. 250 p. 278 refs. In German.

Problems connected with the integration of man in the technological environment of today are examined, giving attention to dangers connected with the monotony and the mental stress to which man is subjected during the work process. A theoretical analysis of test-connected relations is conducted, taking into account a cybernetic analysis of the factor 'man,' an analysis of technical factors involved in control and guidance activities, aspect of psychophysical performance and mental load. Approaches and equipment needed for the experimental investigations are discussed together with model concepts concerning physiological changes under mental stress, the effect of stimulants on performance, effects produced by tranquilizers, the influence of alcohol on tracking performance, and tests involving psychopharmacological agents. G.R.

A73-20389 # The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials (Die Objektivierung des Einflusses von Belastung und Beanspruchung auf einen Informationsaufnahmeprozess des Menschen mit Hilfe von akustisch evozierten Potentialen). K.-P. Klinger. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1972. 166 p. 163 refs. In German.

Questions of the modulation of the measured physiological parameter of the evoked potential in the case of acoustical signals are investigated, taking into account modulation produced by changes in information, load, or degree of vigilance. Spontaneous fluctuations of the electroencephalogram are superposed on the individual response to the stimulus. An averaging procedure is used in order to improve the signal/noise ratio. The results obtained are discussed in connection with problems of information representation, stresses caused by noise signals, and questions concerning the factors which affect the vigilance. Attention is also given to psychomotoric stresses. G.R.

A73-20391 # Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram (Wachsamkeitsprognose mittels Computeranalyse des spontanen Elektroenzephalogramms). J. Holoch. München, Technische Universität, Fakultät für allgemeine Wissenschaften, Doktor der Naturwissenschaften Dissertation, 1972. 105 p. 109 refs. In German.

The procedure for the determination of vigilance discussed provides an approach for recording human vigilance during long-term investigations. Methods for visualizing consciousness conditions are discussed together with vigilance theories. Four levels of vigilance are considered. The processing of the EEG data is carried out with the aid of a recognition system for spectral patterns in the EEG. The theoretical basis for the recognition system and its practical application has been described by Böttge (1972). A classification is provided of the individual EEG sections which represent directional and reduced vigilance. G.R.

A73-20393 # The average information transmitted in the case of multidimensional stimuli involving tactile information transmission (Synentropie von mehrdimensionalen Reizen bei taktiler Informationsübertragung). R. Bäuerle. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1972. 85 p. 38 refs. In German.

The methods employed for measuring information transmission in the case of stimuli affecting human senses are discussed. The informational transmission based on the identification of learned signals is selected for studies of tactile information transmission. The results obtained in experiments regarding the identification of signals associated with four dimensions are presented and analyzed. It is shown that the learned tactile signals employed can be approximately identified on the basis of the sum of the information transmissions for each dimension. The corresponding parameter values are provided. Using results obtained by other investigators, an approach is shown for applying the scheme of the additive information channel also to problems involving absolute judgments in the case of other sensory modalities. G.R.

A73-20399 Human operators and automatic adaptive controllers - A comparative study on a particular control task. I. H. Witten and M. J. Corbin (Essex, University, Colchester, Essex, England). *International Journal of Man-Machine Studies*, vol. 5, Jan. 1973, p. 75-104. 34 refs. Research supported by the Medical Research Council.

An intensive comparison of several different types of controller is made, using a well-defined control task. The controllers considered are classed as human operators, automatic controllers with fixed control policies, and automatic adaptive controllers. The main point of interest is the final performance obtainable by different varieties of adaptive controller after a sufficiently long learning period. The fixed controllers were used only to delimit the possible behaviors of the adaptive controllers. A simplification of a learning machine called STELLA (Andreae, 1964; Gaines and Andreae, 1966) which was proposed to deal with control environments with random components is investigated. F.R.L.

A73-20400 Random logic nets - Stability and adaptation. I. Aleksander (Kent, University, Canterbury, Kent, England). *International Journal of Man-Machine Studies*, vol. 5, Jan. 1973, p. 115-131. 9 refs.

Recent work on the behavior of randomly interconnected memory elements is reviewed. A natural tendency for stability in 'adapting' and 'untrained' nets, as previously seem empirically, is analyzed and related to the net elements. This shows that elements with low K can be expected to be more stable than those with high K. However, from a point of view of adaptation, it is shown that the greater the K the greater will be the discrimination of the net. It is concluded that it is the stability of the network which enables it to interact 'intelligently' with its environment. F.R.L.

A73-20453 * Photosensitized inhibitor formation in isolated, aging chloroplasts. G. Harnischfeger (Florida State University, Tallahassee, Fla.). *Planta*, vol. 104, 1972, p. 316-328. 17 refs. Research supported by the Bundesministerium für Bildung und Wissenschaft; Grant No. NGR-10-004-018.

A73-20456 * Mitotic activity in dorsal epidermis of *Rana pipiens*. H. Garcia-Arce and S. Mizell (Indiana University,

Bloomington, Ind.). *Comparative Biochemistry and Physiology*, vol. 42A, no. 2, 1972, p. 501-509. 29 refs. Grant No. NGR-15-003-053.

Study of statistically significant rhythms of mitotic division in dorsal epidermis of frogs, *Rana pipiens*, exposed to a 12:12 light:dark environment for 14 days. The results include the findings that (1) male animals have a primary period of 22 hr in summer and 18 hr in winter, (2) female animals have an 18 hr period, and (3) parapinealectomy and blinding abolish the rhythm. M.V.E.

equivalent to the Munsell value, transformed from the convolution product of the line spread function and the spatial distribution of the luminous reflectance. The computed results coincide with the experimental results obtained by Nelson and can illustrate those obtained by Yamanaka, et al. (Author)

A73-20976 # Renal component of the antigravitation function of the organism (Pochechnyi komponent antigravitatsionnoi funktsii organizma). G. S. Belkina. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 8-13. 52 refs. In Russian.

A review of published studies concerning the antigravitation function of the organism leads to the conclusion that the aldosterone-antiuretic hormone-kidney system and the renin-angiotensin-blood circulation system are the basic control systems of the antigravitation-function renal component. The former system is active in leveling the circulating blood volume by activating the antiuretic and anti-sodium-uretic reflexes and the latter system is active in leveling the hydrostatic effect of gravity, with aldosterone linking the activities of both systems. The two systems are characterized as a single regional functional system incorporated in the overall mechanism of antigravitation of the organism. V.Z.

A73-20977 # Effect of accelerations on the thiamine-S/35 distribution in the organism of white mice (Vliyanie uskoreniia na raspredelenie tiamina-S/35 v organizme belykh myshei). V. N. Totskii and L. M. Rovner. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 13-19. 8 refs. In Russian.

Blood radioactivity was measured in the brain, heart, liver, kidneys, spleen, intestines, and subcellular liver cell fractions of white mice at different times following S(35) thiamine administration and exposure to accelerations at 5.5 to 6 g. The substantial changes in blood thiamine distribution established after exposures are linked to vitamin metabolism disturbances and to the permeability of cellular and subcellular membranes. V.Z.

A73-20978 # Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours (Morfologicheskie izmeneniia iukstaglomeruliarnogo apparata pochek krys pri mnogochasovom deistvii raznopravlennykh uskorenii). A. S. Pankova. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 19-23. 10 refs. In Russian.

A73-20979 # Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere (Termoregulatyonnye reaktsii u krys v gipokicheskoi atmosfere s azotnym i gelyevym razrabavleniem). G. V. Troshikhin. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 23-27. 15 refs. In Russian.

A73-20980 # Pathogenesis of some respiration and circulation reactions to barometric pressure gradients (O patogeneze nekotorykh reaktsii dykhaniia i krovoobrashchenii pri perekopakh barometricheskogo davlenii). G. B. Bogoslovov. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 27-29. 22 refs. In Russian.

A73-20981 # Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation (Morfologicheskie izmeneniia v semennikakh sobak pri kronicheskem i kombinirovannom gamma-obluchenii). G. I. Plakhuta-Plakutina, E. A. Savina, and N. L. Fedorova. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 29-34. 16 refs. In Russian.

A73-20982 # Effect of some pharmacological preparations on the fall-out nystagmus and Bechterew nystagmus (Vliyanie nekotorykh farmakologicheskikh preparatov na nistagm vypadeniiia i Bekterevevskii nistagm). E. L. Epstein. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 34-38. 19 refs. In Russian.

The fall-out nystagmus and Bechterev nystagmus were studied in guinea pigs with monolateral and bilateral labyrinthectomies after

A73-20577 Digital computer studies of respiratory control. H. T. Milhorn, Jr. and W. J. Reynolds (Mississippi University, Jackson, Miss.). In: Conference on Decision and Control and Symposium on Adaptive Processes, 11th, New Orleans, La., December 13-15, 1972, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1972, p. 1-4. 12 refs.

For a variety of situations, experimental data are presented that are to be used for verifying the validity of models of the respiratory control system. Following a description of the procedures used in the collection and computer-aided analysis of these data, a brief example is offered of their use in developing a model of ventilatory control. M.V.E.

A73-20578 A model to predict respiration from VCG measurements. R. C. Wang (Johns Hopkins University, Baltimore, Md.) and T. W. Calvert (Simon Fraser University, Burnaby, British Columbia, Canada). In: Conference on Decision and Control and Symposium on Adaptive Processes, 11th, New Orleans, La., December 13-15, 1972, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1972, p. 14-18. 9 refs.

Demonstration of the possibility to predict respiration from vectorcardiogram (VCG) measurements, and substantiation of the hypothesis that the rotation of the intrinsic components of the heart is a measure of the actual rotation of the heart. On this basis, a simple model of the mechanics of the heart, diaphragm, and lungs is presented as a crude first approximation. M.V.E.

A73-20587 Current status of models for the human operator as a controller and decision maker in manned aerospace systems. D. L. Kleinman (Systems Control, Inc., Palo Alto, Calif.) and A. V. Phatak (Systems Control, Inc., Cambridge, Mass.). In: Conference on Decision and Control and Symposium on Adaptive Processes, 11th, New Orleans, La., December 13-15, 1972, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1972, p. 266-271. 23 refs.

In this paper we survey accepted techniques and models for analyzing and predicting human performance in complex multi-control and multidisplay situations commonly found in aerospace systems. The models that we consider have been developed or proposed for the related human functions of information processing, decision making and control. This paper discusses the relative advantages, disadvantages and limitations of each of the modeling schemes. Prospects for mechanizing all or part of the decision functions performed by human operators are considered, specific examples being in the automation of human failure detection and adaption to sudden changes in the system operating conditions. (Author)

A73-20812 Analysis of contrast and assimilation effects on the basis of receptive field models. K. Takahama and Y. Kurioka (Ministry of International Trade and Industries, Amagasaki, Hyogo, Japan). *Electronics and Communications in Japan*, vol. 55, Jan. 1972, p. 118-125. 13 refs. Translation.

Two psychological phenomena, specifically, contrast and assimilation effects, are analyzed on the basis of the function of vertebrate retinas. It is assumed that an 'on' center-'off' surround receptive field generates the line spread function of the human visual system and that the effective lightness of an object perceived is

A73-20983

injection of (1) placebo, (2) scopolamine, (3) armine, (4) diphenidol, (5) pediphenine, (6) metamisine, and (7) marezine. Preparations (2), (6) and (7) substantially reduced the Bechterew nystagmus frequency in guinea pigs with bilateral labyrinthectomy, and preparations (4) and (7) substantially reduced the fall-out nystagmus frequency in guinea pigs with monolateral labyrinthectomy. V.Z.

A73-20983 # Effect of lasting hypodynamia on rat biology (O vliianii dilitel'noi gipodinamii na biologiu krys). E. A. Stroganova. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 38-44. 6 refs. In Russian.

Thirty six young albino rats with motion constraints in small cages were smaller and gained less weight than control rats after a 62-day confinement. Experimental female rats showed more sexual desire than their control counterparts. The offspring of the experimental group grew and developed slower than their control counterparts, the difference leveling off in a month and later. V.Z.

A73-20984 # Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products (Radiatsionnoe okislenie primesei vody vlagosoderzhashchikh produktov zhiznedeiatel'nosti cheloveka). N. V. Bychkov, A. N. Kasperovich, V. V. Krasnoshchekov, V. P. Plotnikova, Iu. E. Siniak, V. F. Stolbov, S. V. Chizhov, and M. I. Shikina. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 44-47. 5 refs. In Russian.

Description of water recycling experiments, using gamma radiation for purification of condensates from human wastes, perspiration, wash water and atmospheric moisture, for water retrieval in a life support system. Gamma radiation was applied for oxidation of impurities in the presence of hydrogen peroxide. The oxidative efficiency of different gamma doses is evaluated. Toxicological evaluation of the recycled water is also included. V.Z.

A73-20985 # Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia (Reguliatsiya vertikal'noi pozы posle poleta na korabliakh 'Soiuz-6'-'Soiuz-8' i 120-sutochnoi gipokinezii). Iu. N. Purakhin, L. I. Kakurin, V. S. Georgievskii, B. N. Petukhov, and V. M. Mikhailov. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 47-53. 22 refs. In Russian.

Study of erect posture control in 7 crew members of the Soiuz 6, 7 and 8 spacecraft following their flights and in 10 subjects after 120-day bed rest. Stabilographic measurements and neurological and blood circulation tests were made before and after exposures, showing the occurrence of coordination disturbances during flight and bed rest. Increased heart beat rates and a higher blood pressure were recorded in the astronauts. Also vegetative nervous system reactions, more pronounced in bed rest experiments, were recorded. V.Z.

A73-20986 # Respiration mechanics during weightlessness simulation in an immersion medium (Mekhanika dykhaniia pri imitatsii nevesomosti v immersionnoi srede). M. A. Tikhonov. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 53-56. 12 refs. In Russian.

Pulmonary volume, respiratory tract resistance and expansion of the lungs were measured in 6 healthy subjects during 18-hr immersion in water in a supine position at comfortable temperature. The residual lung capacity of the subjects was decreased by about 7% during the whole immersion time; their respiratory tract resistance increased by 65 to 80% at the beginning of immersion and then tended to level off, as did the expansion of their lungs after an initial reduction by about 20%. Internal pressure shifts and blood circulation volume redistribution are discussed as possible causes of the observed changes in the respiratory and pulmonary characteristics of the subjects. V.Z.

A73-20987 # Analysis of some mechanisms of human stability to decompression of the lower portion of the body (Analiz

nekotorykh mekhanizmov ustochivosti cheloveka k dekompressii nizhnei poloviny tela). P. M. Suvorov and R. V. Beleda. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 56-59. 8 refs. In Russian.

Heart beat and respiration rates, blood pressure, systolic and minute blood volumes, peripheral resistance, and urine adrenal, noradrenalin, and 17-oxycorticosteroids were determined in 40 pilots and 14 other subjects whose lower body portion was under decompression at 50 and 70 torr for up to and above 9 min and 5 min 18 sec, respectively. Decompression reduced the function of the sympathoadrenal system and steroid hormone secretion from the adrenal cortex, leading to some cardiovascular disorders. V.Z.

A73-20988 # Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability (Vliyanie gazovo smesi s povyshennym soderzhaniem kisloroda i uglekisloty na ortostaticheskuiu ustochivost' cheloveka). V. I. Korol'kov, A. A. Savilov, and I. Ia. Lunev. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 60-64. 24 refs. In Russian.

A73-20989 # Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness (Sutochnaya dinamika psichicheskoi rabotosposobnosti v usloviakh 72-chasovogo preryvynnogo bodrstvovaniia). A. L. Narinskaiia. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec., 1972, p. 64-69. In Russian.

Five mental performance test programs were conducted on ten healthy male subjects who were kept wakeful for 72 hr after a 3-day preparation period with tests. The performance tests included memorization of a text, ciphering assignments, proofreading assignments, and addition of combinations of numbers with shifts. The performance was adversely affected by wakefulness in nine of the subjects. The fluctuations of performance during the day were more rhythmic in four subjects than in the other six subjects. V.Z.

A73-20990 # Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness (O primenenii gidrokarbonata natriia v kachestve sredstva lecheniya i profilaktiki bolezni dvizheniya). V. N. Barnatskii, I. I. Briano, R. M. Volosevich, D. P. Komarova, A. G. Kuznetsov, A. T. Poleschuk, and I. G. Tazetdinov. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 70-75. 13 refs. In Russian.

A73-20991 # Effects of high mountain climbing on the human organism (Osobennosti vliianii zaniatiia vysotnym alpinizmom na organizm cheloveka). G. R. Rung. *Kosmicheskaiia Biologija i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 76-82. 24 refs. In Russian.

Summary of the effects of mountain climbing on the human organism as observed over a six year period on 70 experienced members of six expeditions to altitudes up to 7,500 m in the Caucasus, Tien Shan, and Pamir. The adaptation characteristics of the mountain climbers are discussed, with recommendations for more effective adaptation and ascent. V.Z.

A73-21015 # Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. M. Guazzi, F. Magrini, C. Fiorentini, and A. Polese (Milano, Università, Milan, Italy). *British Heart Journal*, vol. 35, Jan. 1973, p. 55-64. 14 refs.

A73-21135 # Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers Balanus rostratus Hock (Primenenie metoda polarizatsionnoi ul'trafioletovoi fluorentsientnoi mikroskopii dlia izucheniiia gigantskikh myshechnykh volokon Balanus rostratus Hock). N. A. Chernogradianskaiia, I. Ia. Barskii, M. S. Shudel', Iu. M. Rozanov, and Iu. S. Borovikov (Akademiiia Nauk SSSR, Institut Tsitologii, Leningrad, USSR). *Akademiiia Nauk SSSR, Doklady*, vol. 207, Nov. 11, 1972, p. 445-448. 5 refs. In Russian.

A73-21136 # Transglucosidase activity of heart-muscle per-glucohydrolase (Transgliukozidaznaia aktivnost' nad-gliukogidrolazy rmyshtsy serdtsa). G. M. Boriskina and L. A. Tseitlin (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiiia Nauk SSSR, Doklady*, vol. 207, Nov. 11, 1972, p. 464, 465. 10 refs. In Russian.

A73-21199 Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta. H. Schmid-Schönbein (München, Universität, Munich, West Germany), R. E. Wells (Peter Bent Brigham Hospital, Boston, Mass.), and J. Goldstone (Harvard University, Boston, Mass.). *Pflügers Archiv*, vol. 338, no. 2, 1973, p. 93-114. 48 refs. Research supported by the Max Kade Foundation, John A. Hartford Foundation, and Deutsche Forschungsgemeinschaft; Grant No. PHS-SP01-HE-11306.

A73-21200 Action of a serum protein on muscular contraction. A. A. Hakim (Illinois, University, Chicago, Ill.). *Pflügers Archiv*, vol. 338, no. 2, 1973, p. 133-157. 41 refs. Grant No. PHS-NIGMS-18846-01.

Study of the action of human serum protein on (1) glycerol-treated rabbit muscle fiber, (2) a purified human actomyosin preparation, (3) rat heart muscle preparations, and (4) human and canine papillary heart muscle preparations. The serum protein enhanced the ATP-induced tension in (1), increased tension characteristics in response to electrical stimulation in (2), (3) and (4), increased contraction in (3), and promoted actomyosin precipitation in (2). V.Z.

A73-21214 Pattern of blood flow within the heart - A stable system. D. E. M. Taylor and J. D. Wade (Edinburgh, University, Edinburgh, Scotland). *Cardiovascular Research*, vol. 7, Jan. 1973, p. 14-21. 25 refs. Research supported by the Scottish Hospitals Endowment Research Trust and British Heart Foundation.

Experiments were conducted on dogs and sheep to determine the type of flow patterns occurring in the heart. A technique of flow visualization by fine stream indicator injection was employed. Recording methods based on cineangiography or endoscopic intracardiac cineradiography were used. It was only possible to determine whether or not flow patterns were stable or unstable. High frequency response velocity estimations would be required in addition to determine whether or not turbulence was present. G.R.

A73-21215 Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. P. G. I. Stovin and J. P. Reed (Papworth Hospital, Papworth Everard, Cambs., England). *Cardiovascular Research*, vol. 7, Jan. 1973, p. 39-46. 24 refs. Research supported by the East Anglian Regional Hospital Board.

A73-21216 Analysis of indicator distribution in the determination of cardiac output by thermal dilution. A. C. A. P. Vliers, K. R. Visser, and W. G. Zijlstra (Groningen, Rijksuniversiteit, Groningen, Netherlands). *Cardiovascular Research*, vol. 7, Jan. 1973, p. 125-132. 20 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

A73-21217 Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistocatheter. A. C. A. P. Vliers, B. Oeseburg, K. R. Visser, and W. G. Zijlstra (Groningen, Rijksuniversiteit, Groningen, Netherlands). *Cardiovascular Research*, vol. 7, Jan. 1973, p. 133-138. 13 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

A73-21218 * Method for measuring the contractions of small hearts in organ culture. K. Wildenthal, D. R. Harrison, G. H. Templeton, and W. C. Reardon (Texas, University, Dallas, Tex.; NASA, Ames Research Center, Moffett Field, Calif.). *Cardiovascular*

Research, vol. 7, Jan. 1973, p. 139-144. Research supported by the American Heart Association; Grant No. NIH-HE-14706.

An instrument that was originally designed to detect micro-vibrations of aircraft wings has been adapted for use in measuring the amplitude, rate, and time-course of contraction of isolated foetal mouse hearts. The device is capacitance-sensitive and responds to small displacements of objects in its electrical field. The beating of a heart positioned near the probe produces such displacements. The effects of noradrenaline, acetylcholine, calcium, and temperature as detected by the probe are similar to their effects on cardiac muscle shortening as measured by conventional techniques. The method has the advantage of not requiring physical attachment of transducers directly to the tissue, which can seriously damage the contractile ability of small, fragile hearts. (Author)

A73-21225 Evoked potential correlates of expected stimulus intensity. H. Begleiter, B. Porjesz, C. Yerre, and B. Kissin (Downstate Medical Center, Brooklyn, N.Y.). *Science*, vol. 179, Feb. 23, 1973, p. 814-816. 14 refs. Grants No. NIH-MH-13145; No. NIH-MH-16477.

Different wave shapes were obtained experimentally for potentials evoked by visual stimuli of constant intensity, whose perceived intensities were modified by psychological set. All data were derived from monopolar scalp recordings of human subjects. The visual stimuli were flashes transmitted through three different neutral density filters, which were used to reduce the light intensity of the photostimulator by a definite ratio. The electrophysiological responses to a flash of medium intensity have different wave shapes in trials in which the occurrence of bright or dim stimuli is expected. When a bright or dim stimulus is signaled, the potentials evoked by the medium stimulus resemble the responses evoked by a real bright or dim flash. F.R.L.

A73-21248 # The consequences of partial inanition in hot climates (Les conséquences de l'inanition partielle dans les climats torrides). H. Ducros. *Revue des Corps de Santé des Armées*, vol. 13, Dec. 1972, p. 669-691. 28 refs. In French.

An attempt is made to show the influence of the thermal factor on protidic and lipidic catabolisms, as well as dehydration, when subjecting young men to partial food deprivation for three- to six-day periods. Knowledge of hydrous and mineral energy stores, as well as nitrogenous and electrolytic eliminations, made it possible to make a study in depth of metabolic balances. If the metabolic perturbations arising only from the deficiency of energy stores cease after three or four days of normal diet, it is not the same when the dehydration values set the pace for other catabolisms. F.R.L.

A73-21319 # Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropic hormone excretion levels at various stages of ontogenesis (Sootnoshenie chastotno-amplitudnykh pokazatelei elektricheskoi aktivnosti mozga i urovnja ekskretsii gonadotropnykh gormonov na raznykh etapakh individual'nogo razvitiya). N. M. Tkachenko (Ministerstvo Zdravookhraneniia SSSR, Vsesouznyi Nauchno-Issledovatel'skiy Institut Akusherstva i Ginekologii, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1686-1694. 33 refs. In Russian.

A73-21320 # The interaction between muscle groups in a complex motor act in humans (Vzaimodeistvie myshechnykh grupp v slozhnom dvigatel'nom akte cheloveka). M. A. Alekseev and A. V. Naidei' (Akademiiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1721-1730. 17 refs. In Russian.

Study of the nature of the relations between the responses of agonists and leg muscles involved in posture maintenance in the case of voluntary dorsal or plantar flexion of the foot. It is shown that the leg muscles are activated earlier than the agonists, thus providing a preventive correction of posture in anticipation of its derangement.

A73-21321

by voluntary movement. A retroactive effect of voluntary contraction of the agonist on the amplitude, duration, and rate of activation of the posture muscles is established. The reverse effect is practically absent. The observed properties of posture responses impart to them the features of an avoidance reaction and impart to their relations with the agonists features of conditioned reflex connections. A.B.K.

A73-21321 # Effect of heparin on blood platelet aggregation and trombosis under the action of direct electric current (Vliianie heparina na agregatsiu krovianykh plastinok i tromboobrazovanie pod deistviem postoiannogo elektricheskogo toka). V. I. Mishchenko (Chitinskii Meditsinskii Institut; Chitinskii Pedagogicheskii Institut, Chita, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1744-1748. 12 refs. In Russian.

A73-21322 # Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia (Matematicheskii analiz reaktsii dykhatel'noi sistemy cheloveka na gipoksiu i giperkapniu). I. S. Breslav, A. G. Zhironkin, V. N. Salazkin, and A. M. Shmeleva (Akademiiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1749-1755. 14 refs. In Russian.

Results of a mathematical treatment of the ventilatory responses of humans to the inhalation of hypoxic and hypercapnic mixtures by the method of multiple correlation and regression analysis. Equations are obtained which characterize the quantitative relations between the minute respiratory volume and the parameters of the gas composition of the inner and ambient media. The relations derived make it possible to estimate the relative weights of the hypoxic and hypercapnic stimuli in the regulation of human respiration. A.B.K.

A73-21323 # Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold (Uchastie bystrykh i medlennykh myshechnykh volokon v izmeneniiakh elektricheskoi aktivnosti skeletnykh mysht krys pri ostrom i khronicheskom deistvii khodata). N. M. Tumakova (Akademiiia Nauk SSSR, Institut Fiziologii, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1765-1768. 14 refs. In Russian.

A73-21324 # A method for electrocardiogram recording in Rhesus monkeys (O metodike zapisi elektrokardiogrammy u obez'yan porody makak rezusov). S. A. Gulieva (Azerbaidzhanskii Gosudarstvennyi Institut Vsovershenstvovaniia Vrachei; Ministerstvo Zdravookhraneniia Azerbaidzhanskoi SSR, Nauchno-Issledovatel'skaiia Problemnaiia Naftalanovaiia Laboratoriia, Baku, Azerbaidzhansk SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1779-1781. 15 refs. In Russian.

A73-21325 # Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute (Pribory dlia dinamicheskoi registratsii ob'emonii skorosti krovotoka pri velichinakh, men'shikh 1 ml. v minutu). E. L. Meshcherskii, N. K. Loginova, V. M. Khaiutin, and A. I. Bartyzel' (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1781-1785. In Russian.

A73-21375 # Liquid flow in a pipe with a deformable wall and valves (Tehenie zhidkosti v trubke s deformiruushcheisya stenkoi pri nalichii klapanov). I. M. Skobeleva (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Mekhanika Polimerov*, Sept.-Oct. 1972, p. 903-908. In Russian.

Discussion of the function of a 'muscle pump' represented by an elastically deformable pipe with valves, simulating a blood vessel. Expressions are derived and solved to describe the passage of a viscous liquid in a finite-length pipe terminated by valves, assuming that the elastic properties of the pipe wall vary periodically with time. V.Z.

A73-21425 Language and brain - Principles, system theories, and their boundaries (Sprache und Gehirn - Grundlagen, Systemtheorien und ihre Grenzen). A. E. Adams (Köln, Neurologische Klinik; Max-Planck-Institut für Hirnforschung, Cologne, West Germany). *Naturwissenschaftliche Rundschau*, vol. 26, Feb. 1973, p. 57-65. 114 refs. In German.

The detection of linguistic disturbances in the case of cerebral lesions shows that ordered mental activities and meaningful speech are not necessarily connected. The patients suffering from aphasia are unable to speak, but are capable to understand, write, and read their language. Questions of the localization of functions are discussed together with primary locality-specific and secondary pattern-specific cerebral functions, lesions of the cortex, and interhemispheric functions. Linguistic structures and semantic aspects are considered, giving attention to phonetic structures, the order of words according to the frequency of their occurrence, and an approach proposed by Zipf (1935, 1945, 1949). G.R.

A73-21464 * The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. J. D. Frost, Jr., J. R. G. Carrie, R. P. Borda, and P. Kellaway (Methodist Hospital; Baylor University, Houston, Tex.). *Electroencephalography and Clinical Neurophysiology*, vol. 34, Feb. 1973, p. 171-175. 17 refs. Contract No. NAS9-11120; Grants No. NIH-RR-259; No. NIH-HE-05435.

Evaluation of the changes in the waking EEGs of six healthy male subjects who received 30 mg daily oral doses of flurazepam hydrochloride for two weeks. A placebo was then substituted for flurazepam for another two weeks. An increase in beta activity with a maximum in fronto-central leads was observed during the test period. A small increase in the mean wavelength of the alpha and theta activities in the central-occipital derivations was also apparent in the subjects during the period. V.Z.

A73-21465 Non-Gaussian properties of the EEG during sleep. M. S. Weiss (Washington State University, Pullman, Wash.). *Electroencephalography and Clinical Neurophysiology*, vol. 34, Feb. 1973, p. 200-202. 5 refs.

EEG data from a sleeping experiment on a 21-year old female subject are used for a tentative qualitative assessment of the relationship between the non-Gaussian activity and the spectral properties of the EEG. A spectral and amplitude EEG analyses showed that the low frequency activity during sleep was positively correlated in time with the non-Gaussian behavior of the EEG. The amount of non-Gaussian activity was lower during a non-slow wave sleep. V.Z.

A73-21475 # A mathematical model to assess changes in the baroreceptor reflex. B. B. Kent (Mount Sinai School of Medicine, New York, N.Y.), J. W. Drane (Texas, University, Dallas, Tex.), B. Blumenstein, and J. W. Manning (Emory University, Atlanta, Ga.). *Cardiology*, vol. 57, no. 5, 1972, p. 295-310. 31 refs. Research supported by the Georgia Heart Association; Grant No. NIH-NS-02645.

A mathematical model is proposed to explain the relation between carotid sinus pressure and systemic arterial pressure. The parameters of the model are (1) the total range of systemic arterial pressure control, (2) the carotid sinus pressure, (3) the sensitivity of reflex response, and (4) the lower systemic arterial pressure limit at maximum carotid sinus stimulation. The merits and technical limitations of the model are evaluated by experiments on cats. V.Z.

A73-21501 Effects of lung volume and disease on the lung nitrogen decay curve. K. Prowse and G. Cumming (Birmingham, University, Birmingham, England). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 23-33. 56 refs.

A73-21502 A model for the elastic properties of the lung and their effect on expiratory flow. R. K. Lambert and T. A. Wilson (Minnesota, University, Minneapolis, Minn.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 34-48. 19 refs. PHS-supported research.

The lung parenchyma is pictured as a number of interconnected, randomly oriented, plane, elastic membranes. The elastic properties which the membranes must have in order for the membrane network to match the average pressure-volume behavior of the lung are found to be qualitatively similar to the elastic properties which have been observed for other biological membranes. The relations between the average stresses in the membrane array and the displacement field for the array is shown to be the same as the constitutive relations for an elastic continuum, and the two elastic moduli which appear in these equations are evaluated. These constitutive equations are used as a mathematical model for the parenchyma.

(Author)

A73-21503 Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. M. Epstein and T. Saruta (USAF, School of Aerospace Medicine, Brooks AFB; Texas, University, Dallas, Tex.; Miami, University; U.S. Veterans Administration Hospital, Miami, Fla.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 49-52. 30 refs.

A73-21504 Cardiovascular changes in middle-aged men during two years of training. F. W. Kasch, W. H. Phillips, J. E. L. Carter, and J. L. Boyer (San Diego State College, San Diego, Calif.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 53-57. 30 refs. Research supported by the San Diego State College Foundation; Grant No. PHS-CD-00140.

Fifteen sedentary middle-aged men (39-60 years, mean 47) were divided into exercise ($n = 9$) and nonexercise ($n = 6$) groups for a comparison of the effects of 2 years physical training. Exercise consisted of 60-min sessions, principally running, three times per week. Evaluations were made at 6-month intervals. Mean maximum aerobic capacity improved 17% over the 2-year period from 2.589 to 3.036 l/min in the trained group. Maximum pulmonary ventilation increased 7% from 115 to 123 l/min BTPS. Maximum heart rate decreased 6 beats to 174.

(Author)

A73-21505 Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. P. R. Westbrook, S. E. Stubbs, A. D. Sessler, K. Rehder, and R. E. Hyatt (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 81-86. 31 refs. Research supported by the Minnesota Respiratory Health Association; Grants No. NIH-HL-12229; No. NIH-RR-585; No. NIH-HL-12090.

A73-21506 Central, femoral, and brachial circulation during exercise in hypoxia. L. H. Hartley, J. A. Vogel, and M. Landowne (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 87-90. 13 refs.

This study was performed to determine the response of the central and peripheral circulation to hypoxia. Cardiac output (dye dilution) and peripheral venous and arterial blood gases were examined during work in seven normal males. Observations were made in normoxia and hypobaric hypoxia. Although submaximal O₂ uptake at each work load was unchanged in hypoxia, the maximal O₂ uptake was decreased to 75% of the normoxia value. The oxygen transport in the presence of the reduced arterial O₂ content (75% of sea-level values) was supplied by greater cardiac output and more femoral flow as judged by the narrower femoral arteriovenous O₂ content differences. Also, lower values of femoral venous oxygen pressure were achieved in hypoxia (mean 15 mm Hg) compared to normoxia (20 mm Hg).

(Author)

A73-21507 * Changes in total plasma content of electrolytes and proteins with maximal exercise. W. van Beaumont, J. C. Strand, J. S. Petrofsky, S. G. Hipskind, and J. E. Greenleaf (St. Louis, University, St. Louis, Mo.; NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 102-106. 27 refs. Grant No. NGR-26-006-039.

To determine to what extent the increases in concentration of plasma proteins and electrolytes with short maximal work were a result of hemoconcentration, the changes in plasma volume and total content of the plasma constituents were simultaneously evaluated. The results obtained from six human subjects indicated that in comparison to preexercise values there was a net decrease in total content of plasma protein, sodium, and chloride in the first 2 min of the postexercise period, due primarily to a significant loss (13-15%) of plasma fluid. The total plasma potassium content was increased immediately after exercise but was significantly below the pre-exercise plasma content after 2 min of recovery.

(Author)

A73-21508 Effect of training on enzyme activity and fiber composition of human skeletal muscle. P. D. Gollnick, B. Saltin, C. W. Saubert, W. L. Sembrowich, R. E. Shepherd (Washington State University, Pullman, Wash.), and R. B. Armstrong. *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 107-111. 30 refs.

A73-21509 Heated Fleisch pneumotachometer - A calibration procedure. S. Z. Turney and W. Blumenfeld (Maryland, University, Baltimore, Md.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 117-121. 9 refs. Grant No. NIH-GM-15700.

A calibration procedure for the heated Fleisch pneumotachometer (PTM) is presented. Taken into account are the influence of gas viscosity and PTM case temperature on resistance to gas flow through the PTM according to Poiseuille's law. In addition, a temperature change coefficient has been empirically determined for a number-1 Fleisch PTM which permits estimating average gas temperature within the PTM from knowledge of gas temperature entering the PTM, PTM case temperature, and uncorrected estimate of flow. This permits correcting viscosity estimates for temperature at the point where flow is being measured.

(Author)

A73-21510 An implantable glass electrode used for pH measurement in working skeletal muscle. G. Gebert and S. M. Friedman (British Columbia, University, Vancouver, Canada). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 122-124. 5 refs. Research supported by the Medical Research Council of Canada.

Metal-connected pH glass electrodes of Corning 0150 glass were made by coating the intraluminal surface of capillaries with silver (Rochelle salt method). The electrodes were inserted into the gastrocnemius muscle of anesthetized rats. When the muscle was stimulated via the sciatic nerve, interstitial pH decreased only at stimulation frequencies above 1 cycle/sec. With lower frequencies, a slight interstitial alkalosis was observed. We conclude that pH shifts are not important for the regulation of functional hyperemia in response to low-frequency stimulation.

(Author)

A73-21511 On-line computer analysis and breath-by-breath graphical display of exercise function tests. W. L. Beaver (Varian Associates, Palo Alto, Calif.), K. Wasserman (Harbor General Hospital, Torrance, Calif.), and B. J. Whipp (California, University, Los Angeles, Calif.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 128-132. 8 refs. Research supported by Varian Associates; Grant No. PHS-HE-11907.

The problem of making continuous calculations of respiratory variables over the duration of extended physiological studies is so difficult that observations of the breath-by-breath variations of derived quantities such as minute ventilation, oxygen consumption, and gas exchange ratio have not been possible until the recent advent of suitable computers. This paper describes a method for obtaining breath-by-breath measurements of gas exchange using a mini-computer system for the on-line calculation of continuously measured respiratory and metabolic variables. These data are graphically displayed and/or stored on magnetic tape for future display for more extensive calculations.

(Author)

A73-21536 Renal lithiasis among civil operating aircrew (Lithiasis rénale chez le personnel navigant de l'aviation civile). G. Bellanger (Compagnie Nationale Air France, Paris, France). *Revue de*

A73-21537

Médecine Aéronautique et Spatiale, vol. 11, 4th Quarter, 1972, p. 171-175. 9 refs. In French.

A statistical study of renal lithiasis among technical and commercial civil aircrew is made, with attention to the incidence of nephritic colic as well. It appears that the frequency of nephritic colic increases with age, and that females are two to three times less susceptible than males. It is considered that symptoms of renal lithiasis are somewhat more frequent in aircrew than ground personnel, and that treatment of diuresis during and between flights to correct water loss is the best method of prevention. F.R.L.

A73-21537 Renal lithiasis among military operating aircrew (Lithiasie rénale dans le personnel navigant de l'aviation militaire). R. Pannier and G. Leguay (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 176-179. In French.

A search was made for factors in aeronautical activity which could favor renal lithiasis, and an attempt was made to answer other questions concerning flight safety and the procedure to follow for medical assessment. Some surveys of the frequency of renal lithiasis among aircrew are evaluated, and the etiopathogenesis of renal lithiasis in aeronautical activity is discussed. Attention is given to the relationship between renal lithiasis and fitness for flight. F.R.L.

A73-21538 Proteinuria and civil aviation aircrew (Proteinuries et personnel navigant de l'aviation civile). H. Pequignot. *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 180-182. 8 refs. In French.

The problem of proteinuria is discussed, dealing with the single problem of isolated proteinurias. Only orthostatic proteinuria poses frequent problems. It is considered that demonstrated orthostatic proteinuria is not necessarily an illness. Subjects with proteinuria can lead normal lives and can be inoculated. Various studies are reviewed. F.R.L.

A73-21539 Proteinuria and military aircrew (Proteinuries et personnel navigant de l'aviation militaire). G. Leguay and R. Pannier (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 183-189. In French.

Proteinuria poses two major problems: that of fitness for inoculations, and that of tolerance for flight. Experiments on the relationship between flight and proteinuria were carried out on 22 candidates and 38 qualified aircrews of various categories. The detection, study, and classification of proteinuria are discussed. Proteinurias are either transitory, intermittent, or permanent, the intermittent type being the most frequent, and posing most of the problems. The factors of flight affecting proteinuria are hypoxia, accelerations, vibrations, and pressure variations. Criteria for determining fitness are discussed. F.R.L.

A73-21540 Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant (Application de l'étude numérique des séries de temps aléatoires à l'analyse de l'électroencéphalogramme de l'enfant normal). P. Laget, L. Court, D. Dufour, M. H. Bassant, G. Rouif, P. Hillion, C. Lechevallier, and B. Warne-Janville (Paris VI, Université; Ministère des Armées, Service de Santé des Armées; Commissariat à l'Energie Atomique; Délégation Ministérielle pour l'Armement, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 195-205. 8 refs. In French.

A73-21541 Antidiabetic medications and aircrew (Les médicaments antidiabétiques et personnel navigant). R. Pannier (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 206-209. In French.

There are two types of antidiabetic medications: insulins and oral antidiabetics. The latter are suitable only for Type 1 diabetes,

which generally occurs after the age of 35. The hypoglycemic sulfamides and the biguanides are evaluated. Insulin-dependent diabetes makes unfitness obligatory when it affects aircrew because this type of diabetic is subject to acidocetosis, a rigorous diet is required, and because insulin can lead to hypoglycemia. F.R.L.

A73-21542 Is performance a sufficient index to estimate the effects of stresses on the central nervous system (La performance est-elle un indice suffisant pour apprécier les effets des contraintes sur le système nerveux central). R. Angiboust (Ministère des Armées, Centre de Recherches de Médecine Aéronautique, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 210-216. 12 refs. In French.

An attempt is made to show from laboratory experiments what the study of ocular positioning can bring to the knowledge of psychological processes. Displacements of the optical axis occur in two distinct ways: slow movements, and spasmodic movements. An analysis is made of the psychological processes set in motion in an encoding experiment. The importance of knowledge of operative modes to establish a learning criterion is considered. It appears that performance tests cannot in any case be considered as measurement instruments. F.R.L.

A73-21543 An instrument panel on an image tube in color (Un tableau de bord sur un tube à image en couleur). G. Raynaud (Hôpitaux des Armées, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 4th Quarter, 1972, p. 217-219. In French.

The electronic attitude director indicator (EADI), which consists of an instrument panel element using a cathode screen upon which the principal flight parameters are presented, is described. The characteristics of the image are quite special, and show a very distinct advantage over television in contrast and sharpness. Measurements were carried out on a prototype which has since been improved by addition of filters and antireflective treatments. Attention is given to problems of line definition and readability. F.R.L.

A73-21562 Meridional amblyopia - Evidence for modification of the human visual system by early visual experience. D. E. Mitchell (Dalhousie University, Halifax, Nova Scotia, Canada), R. D. Freeman, G. Haegerstrom (California, University, Berkeley, Calif.), and M. Millodot (Montréal, Université, Montréal, Canada). *Vision Research*, vol. 13, Mar. 1973, p. 535-558. 47 refs. National Research Council of Canada Grant No. APA-7660; Grant No. NIH-FR-7006.

Animal studies have convincingly demonstrated that in response to an abnormal visual input imposed during the first few months, an abnormal visual system is developed. An investigation was, therefore, conducted to examine the possibility that the human visual system is influenced by its early visual input. The studies involved a measurement of the orientation differences in grating acuity for a large number of optically corrected astigmats. The data were compared with results obtained from normal eyes. It is suggested that as a result of astigmatism the visual system is deprived of sharp images of contours of certain orientations. G.R.

A73-21563 Size-selective adaptation - Psychophysical evidence for size-tuning and the effects of stimulus contour and adapting flux. F. M. Bagrash (U.S. Navy, Naval Ammunition Depot, Crane, Ind.). *Vision Research*, vol. 13, Mar. 1973, p. 575-598. 26 refs. Grant No. PHS-EY-00360.

Theoretical considerations are discussed, giving attention to the basis of the size selective adaptation effect and to the areal summation function and size-tuning. Three psychophysical experiments are described. It was found that the visibility of a stimulus at threshold increased with the size of the stimulus. The results also suggest that selective adaptation experiments alone cannot be used to distinguish between multiple mechanism and edge-modified single-channel models of spatial integration. It appears that the size-selective adaptation effect, taken by itself, has only limited usefulness for developing quantitative description of spatial integration. G.R.

A73-21564 Acuities for spatial arrangement in line figures
- Human and ideal observers compared. D. P. Andrews, A. K. Butcher, and B. R. Buckley (Keele, University, Keele, Staffs., England). *Vision Research*, vol. 13, Mar. 1973, p. 599-620. 22 refs. Medical Research Council Grant No. G-969/423/B.

The investigation discussed is concerned with spatial integration of positional information on a small scale. Experiments were conducted regarding acuities for spatial arrangement in line figures. The subject responded according to the spatial relationship of two lines, or the shape defined by the parts of a single line. A calculation is presented concerning the best possible perceptual performance that could result from pattern information which enters the visual system. Aspects of high efficiency coding are discussed together with questions of information loss in long lines and information loss in parallelism processing. G.R.

A73-21565 The brightness of coloured flashes on backgrounds of various colours and luminances. P. Whittle (Cambridge University, Cambridge, England). *Vision Research*, vol. 13, Mar. 1973, p. 621-638. 15 refs. Research supported by the Medical Research Council.

Experiments conducted by Whittle and Challands (1969) are extended to different colors of flash and background. It is found that superthreshold experiments analogous to two-color threshold studies reported by Wyszecki and Stiles (1967) but using matching to a standard brightness rather than threshold visibility as the subjective criterion, yield results very similar to the threshold measurements. It is shown that the ratio of the red/green field sensitivities of the lower branches of the constant-brightness curves 1, 2 and 3 log units above threshold is the same as for the corresponding threshold branch. G.R.

A73-21566 Analysis of transient visual sensations above the flicker fusion frequency. J. F. Bird and G. H. Mowbray (Johns Hopkins University, Silver Spring, Md.). *Vision Research*, vol. 13, Mar. 1973, p. 673-687. 24 refs. Grant No. PHS-NS-07226.

An investigation has been conducted of the basic theoretical significance of a transient visual response which has been observed at intermittencies too rapid for visible flicker. Particular attention has been given to the study of the visual transient response produced by an abrupt shift in the period of oscillation of a luminance. An abstract analysis leads to concrete results for these visual transient responses. A simple approximation for the transients is derived. The stimulus waveform parameters and visual system parameters in this approximation are segregated into separate factors. The equisensation laws obtained facilitate the analysis of experimental data. It is found that the visual transient is elemental in character. The transient is a sensitive response, as reflected by the precision of the psychophysical data. G.R.

A73-21567 Visual sensitivity in the presence of alternating monochromatic fields of light. R. A. Glass and C. E. Sternheim (Maryland, University, College Park, Md.). *Vision Research*, vol. 13, Mar. 1973, p. 689-699. 10 refs. Grant No. NIH-EY-00539.

The increment threshold was determined at the time of transition between two background fields of monochromatic light which differed in dominant wavelength, but were of equal brightness. The experiment conducted involved the measurement of changes in sensitivity at the time of rapid change in wavelengths of a background field by determining the threshold luminance of a superimposed test field. Threshold luminance is considered a psychophysical indicator of the magnitude of neural activity in response to the change in wavelength. G.R.

A73-21568 Single cell analysis of saturation discrimination in the macaque. R. L. De Valois and R. T. Marrocco (California, University, Berkeley, Calif.). *Vision Research*, vol. 13, Mar. 1973, p. 701-711. 10 refs. Grants No. PHS-NB-02274; No. PHS-EY-00014.

The results obtained in the analysis show that a mechanism for the discrimination of color purity is present in the lateral geniculate

nucleus (LGN) of the macaque. It appears that the opponent system alone is sufficient to account for the organism's behavior. The responses of spectrally opponent LGN cells vary systematically with the stimulus purity. The spectrally nonopponent cells, on the other hand, showed little or no responses to a shift from white light to any other light of any purity level. G.R.

A73-21569 * Training the visual accommodation system. T. N. Cornsweet (Acuity Systems, McLean, Va.) and H. D. Crane (Stanford Research Institute, Menlo Park, Calif.). *Vision Research*, vol. 13, Mar. 1973, p. 713-715. Contract No. NAS2-5097; Grant No. PHS-1-RO1-NB-08322-01.

The experiment described demonstrates that any perceptible cue which reveals the direction of motion of the target is sufficient to permit the subject to make correct responses. No single cue or particular combination of cues is necessary. In the training procedures described, changes in the subjects' accommodation level have virtually no effect on the blur of the retinal image, and the feedback about accommodation is in that sense entirely artificial. G.R.

A73-21575 Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem (Einfluss hoher Umgebungstemperaturen auf die Leistung und einige physiologische Größen bei einer Tracking- und einer optischen Vigilanz-Aufgabe). J. Rutenfranz, H. G. Wenzel, R. Singer, R. Mocellin, and W. Hawel (Max-Planck-Institut für Arbeitsphysiologie, Dortmund, West Germany). *Nordrhein-Westfalen, Forschungsberichte*, no. 2200, 1971, 36 p. 44 refs. In German.

A73-21612 Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms. A. Malan (CNRS, Laboratoire de Physiologie Respiratoire, Strasbourg, France). *Respiration Physiology*, vol. 17, Jan. 1973, p. 32-44. 12 refs.

A73-21613 Pulmonary respiration and acid-base state in hibernating marmots and hamsters. A. Malan, H. Arens, and A. Waechter (CNRS, Laboratoire de Physiologie Respiratoire, Strasbourg, France). *Respiration Physiology*, vol. 17, Jan. 1973, p. 45-61. 44 refs.

A73-21614 Significance of the Bohr and Haldane effects in the pulmonary capillary. M. P. Hlastala (Washington, University, Seattle, Wash.). *Respiration Physiology*, vol. 17, Jan. 1973, p. 81-92. 22 refs. Grants No. PHS-HE-12174; No. PHS-HE-05819.

A mathematical model was developed to assess the significance of the Bohr and Haldane shifts on determination of partial pressure profiles in the pulmonary capillary. Digital computer calculations showed that these shifts have a marked effect on the partial pressure profiles for both oxygen and carbon dioxide during both hypoxia and normoxia. An effective red cell diffusion capacity for CO₂ was calculated as 1.0 ml per ml per min per min Hg. The half-time of the 'intracellular Bohr-shift' was 25 msec. These values are used to calculate carbon dioxide profiles. Carbon dioxide is not completely equilibrated by the time that blood has traveled through the pulmonary capillary. There is a marked indirect interaction between CO₂ and O₂ diffusion mediated through the Bohr and Haldane effects. (Author)

A73-21615 A model of time-varying gas exchange in the human lung during a respiratory cycle at rest. K. H. Lin and G. Cumming (Queen Elizabeth Hospital, Birmingham, England). *Respiration Physiology*, vol. 17, Jan. 1973, p. 93-112. 13 refs. Research supported by the United Birmingham Hospitals Endowment Research Fund.

Examination of the fluctuations of alveolar gas tension and of the flow of blood through the capillaries in a model which represents

A73-21667

many of the variables encountered in a human lung during quiet breathing. In addition to studying the alveolar gas tension, studies are also made of the pulmonary capillary gas tension both in time and distance along the capillary and of the oxygen uptake and carbon dioxide output during a breathing cycle. The variations in alveolar oxygen tension during a cycle are calculated to be 4.0 mm Hg, while those of carbon dioxide are 3.6 mm Hg. Equilibration between blood and gas is achieved after 40% of the capillary transit time in the case of oxygen and 20% of this time in the case of carbon dioxide. The rate of oxygen uptake is relatively constant at 250 ml/min, but carbon dioxide output varies between 175 and 265 ml/min during a cycle, resulting in a respiratory exchange coefficient ranging between 0.7 and 1.06.

A.B.K.

A73-21667 Comparison of human operator critical tracking task performance with aural and visual displays. E. T. Pitkin (Connecticut, University, Storrs, Conn.) and E. W. Vinje (United Aircraft Research Laboratories, East Hartford, Conn.). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-3, Mar. 1973, p. 184-187. 6 refs. NSF Grant No. GJ-9.

The effects of aural, visual, and combined displays on human tracking performance were evaluated by means of the critical tracking task which employs an unstable controlled element. Four visual displays and an aural display were used in this study. Values of the critical root or maximum degree of instability were developed for each display alone and also for the visual displays used in combination with the aural presentation. Tracking performance, as measured by the critical root, was consistently better for combined visual and aural presentations than for either type of display used alone. This trend was exhibited for each of the four visual displays and for both experienced and inexperienced trackers. These results suggested that combined displays supply greater net usable information to the human's central processor, allowing a significant reduction in estimation errors by the human operator. (Author)

A73-21685 * Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria. H. Gaffron (Florida State University, Tallahassee, Fla.). In: European Biophysics Congress, 1st, Baden, Austria, September 14-17, 1971, Proceedings. Vienna, Wiener Medizinische Akademie, 1971, p. 19-22. NSF Grant No. GB-345; Contract No. AT(40-1)-2687; Grant No. NGR-10-004-018.

The present state of knowledge regarding the truly photochemical reactions in photosynthesis is considered. Nine-tenths of the available knowledge is of a biochemical nature. Questions regarding the activities of the chlorophyll system are examined. The simplest photochemical response observed in living hydrogen-adapted algal cells is the release of molecular hydrogen, which continues even after all other known natural reactions have been eliminated either by heating or the action of poisons.

G.R.

A73-21801 Left ventricular performance after myocardial infarction assessed by radioisotope angiography. W. J. Kostuk, A. A. Ehsani, J. S. Karliner, W. L. Ashburn, K. L. Peterson, J. Ross, Jr., and B. E. Sobel (California, University, La Jolla, Calif.). *Circulation*, vol. 47, Feb. 1973, p. 242-249. 23 refs. Research supported by the Ontario Heart Foundation; Grants No. PHS-PH-43-68-NHLI-1332; No. PHS-HL-14197.

A73-21802 Inability of the submaximal treadmill stress test to predict the location of coronary disease. M. A. Kaplan, C. N. Harris, W. S. Aronow, D. P. Parker, and M. H. Ellestad (U.S. Veterans Administration Hospital; Long Beach, Memorial Hospital Medical Center, Long Beach; California, University, Irvine; Anaheim Memorial Hospital, Anaheim, Calif.). *Circulation*, vol. 47, Feb. 1973, p. 250-256. 21 refs.

Two hundred patients had submaximal treadmill stress tests (STSTs) and selective coronary arteriography performed within 2 months of each other. An attempt was made to assess the predictability of disease isolated to any given coronary vessel by performance on the treadmill. It is concluded that (1) a positive

STST is more likely to be associated with increased severity and extent of coronary artery disease; (2) a negative STST is more likely to be found in disease limited to a single vessel; and (3) within the latter group, the STST is of no value in predicting the specific coronary artery involved. (Author)

A73-21803 Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects. W. S. Aronow (U.S. Veterans Administration Hospital, Long Beach; California, University, Irvine, Calif.). *Circulation*, vol. 47, Feb. 1973, p. 287-290. 14 refs.

One hundred normal subjects who had a double Master's test and a maximal treadmill stress test (MTST) were clinically evaluated 30 months later. Ninety-nine of these 100 subjects (99%) had a follow-up treadmill test at 30 months. One of four subjects with initially an abnormal double Master's test developed coronary heart disease within 30 months. Three of 96 subjects with initially a normal double Master's test developed coronary heart disease within 30 months. Three of 13 subjects with initially an abnormal MTST developed coronary heart disease within 30 months. One of 87 subjects with initially a normal MTST developed coronary heart disease within 30 months. The MTST correlated better than the double Master's test in predicting subsequent coronary heart disease. (Author)

A73-21804 Ventriculographic patterns and hemodynamics in primary myocardial disease. T. H. Kreulen, R. Gorlin, and M. V. Herman (Peter Bent Brigham Hospital; Harvard University, Boston, Mass.). *Circulation*, vol. 47, Feb. 1973, p. 299-308. 43 refs. Grants No. PHS-HL-05679; No. PHS-5-P01-HL-11306-05.

Thirty-four patients with primary myocardial disease were studied and classified into three distinct types based on their left ventriculogram. Each had unique ventriculographic characteristics and findings. Type I are patients with a normal contraction pattern and an elevated left ventricular end-diastolic pressure. Type II A are patients with a hypertrophic pattern without obstruction to outflow while type II B patients have outflow obstruction. Type III A are patients with generalized hypokinesis. Type III B have a similar contraction pattern but in addition show asynergy. Analysis of the right ventriculogram in seven patients showed changes paralleling those seen in the left ventricle, including asynergic patterns of contraction. (Author)

A73-21805 Intravascular platelet aggregation in the heart induced by stress. J. I. Haft (U.S. Veterans Administration Hospital, Bronx, N.Y.) and K. Fani (Mount Sinai School of Medicine, Bronx, N.Y.). *Circulation*, vol. 47, Feb. 1973, p. 353-358. 32 refs.

Sixteen rats, stressed by immersion in ice-cold water for 25-45 min, were found to have platelet aggregates in myocardial small vessels on electron microscopic study. None of six similar non-stressed control rats had platelets in myocardial vessels. It is concluded that stress, probably via catecholamine secretion that enhances platelet stickiness, can induce intravascular platelet aggregation. It is possible that this mechanism plays a part in the relationship between stress and acute clinical myocardial infarction. (Author)

A73-21806 Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/. T. N. James (Alabama, University, Birmingham, Ala.). *Circulation*, vol. 47, Feb. 1973, p. 362-386. 94 refs. Grants No. NIH-HE-11310; No. NIH-PH-4367-1441.

The structure and function of the conduction system of the heart are described, along with the factors important to its normal stability and control. Following a review of myocardial cell classification, some of the ontogeny and phylogeny aspects, and the role of collagen in the conduction system, a discussion is presented about such topics as the sinus node viewed as a servomechanism, baroreflexes and chemoreflexes, and norepinephrine and acetyl-

choline. A survey of the circumstances associated with the occurrence of electrical instability of the heart and an assessment of the possibility to formulate a comprehensive set of 'laws of the heart' conclude the lecture.

M.V.E.

A73-21807 Relation of electrolyte disturbances to cardiac arrhythmias. C. Fisch (Indiana University; Krannert Institute of Cardiology; Marion County General Hospital, Indianapolis, Ind.). *Circulation*, vol. 47, Feb. 1973, p. 408-419. 49 refs. Research supported by the Herman C. Krannert Fund and Indiana Heart Association; Grants No. PHS-HE-6308; No. PHS-HE-5363; No. PHS-HE-5749.

While a number of electrolytes play a role in the genesis of the transmembrane action potential (AP), the changes in the action potential most clearly related to arrhythmias are dependent to a large extent on K+. Potassium gradient is a major determinant of the magnitude of transmembrane resting potential (TRP), and secondarily the rate of rise (dV/dt) of phase 0, and consequently the speed of conduction. The cell membrane conductance for K+, or a decrease therein, is most likely the major determinant of spontaneous slow depolarization during phase 4. Thus K+ has a pronounced effect on both conduction and automaticity. (Author)

A73-21828 * Cinemicrographic study of the development of subsurface colonies of *Staphylococcus aureus* in soft agar. J. R. Wilkins, W. L. Darnell, and E. H. Boykin (NASA, Langley Research Center, Northrop Services, Inc., Hampton, Va.). *Applied Microbiology*, vol. 24, Nov. 1972, p. 786-797. 5 refs.

STAR ENTRIES

N73-16038*# Missouri Univ., Columbia. Space Sciences Research Lab.
THE ROLE OF DEPRESSED METABOLISM IN INCREASED RADIO RESISTANCE Semiannual Status Report
 X. J. Musacchia 14 Sep. 1972 81 p refs
 (Grant NGL-26-004-021)
 (NASA-CR-130381) Avail: NTIS HC \$6.25 CSCL 06C

Studies are presented of the physiology of depressed metabolism, radio-resistance in depressed metabolic states, comparative aspects of depressed metabolism, and gastrointestinal responses to ionizing radiation. Specific data cover helium-cold induced hypothermia in white rats and hamsters, and radiation responses and intestinal absorption in the gerbil. Author

N73-16039*# Wisconsin Univ., Madison. Dept. of Electrical Engineering.
NONINVASIVE MEASUREMENT OF CENTRAL VENOUS PRESSURE Semiannual Status Report, 1 May - 31 Oct. 1972
 John G. Webster and S. Martin Mastenbrook, Jr. Nov. 1972 21 p refs
 (Grant NGR-50-002-204)
 (NASA-CR-130348) Avail: NTIS HC \$3.25 CSCL 06E

A technique for the noninvasive measurement of CVP in man was developed. The method involves monitoring venous velocity at a point in the periphery with a transcutaneous Doppler ultrasonic velocity meter while the patient performs a forced expiratory maneuver. The idea is the CVP is related to the value of pressure measured at the mouth which just stops the flow in the vein. Two improvements were made over the original procedure. First, the site of venous velocity measurement was shifted from a vein at the antecubital fossa (elbow) to the right external jugular vein in the neck. This allows for sensing more readily events occurring in the central veins. Secondly, and perhaps most significantly, a procedure for obtaining a curve of relative mean venous velocity vs mouth pressure was developed. Author

N73-16040*# George Washington Univ., Washington, D.C. Dept. of Medical and Public Affairs.
A BIBLIOGRAPHY OF WILDLIFE MOVEMENTS AND TRACKING SYSTEMS
 Morton Werber Sep. 1970 78 p refs
 (Grant NSR-09-010-027)
 (NASA-CR-130380) Avail: NTIS HC \$6.00 CSCL 06C

A bibliography is presented consisting of 1,005 references concerned with animal orientation, homing, navigation, migration, and home range movements, and the various methods of tracking and monitoring such behavior through biotelemetry, radar, and various banding and tagging techniques. A majority of the publications appeared between 1950 and 1970, although the most intensive search was made of the 1965-1970 period. A small number of older articles and books were included because they appeared to have some special or unusual value. The

references have been organized in two ways. First, they are grouped in primary categories on the basis of the behavior involved such as orientation, homing, etc., and the methods of tracking. Second, within each of the resulting major areas, the items are arranged in terms of the species of animal. This sequence is maintained throughout the bibliography and in many cases represents a rank order according to the number of publications found.

Author

N73-16041# Joint Publications Research Service, Arlington, Va.

SPACE BIOLOGY AND MEDICINE, VOLUME 6, NO. 6, 1972
 18 Jan. 1973 140 p refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 6, no. 6, Nov.-Dec. 1972 p 1-82 (JPRS-58010) Avail: NTIS HC \$9.00

Articles are presented on space biology and medicine which include: research aimed at guaranteeing safety on long flights and reliability of the human component of the man-spacecraft system; space psychology and physiology; spacecraft habitability; and effects of radiation and weightlessness.

N73-16043 Joint Publications Research Service, Arlington, Va.
RENAL COMPONENT OF THE ANTIGRAVITATIONAL FUNCTION IN THE BODY

G. S. Belkaniya *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 7-16 refs

Numerous experiments are cited in which the results indicate that it is possible to define two principal relatively independent regulation systems in the renal component of the antigravitational function. The first system (aldosterone, antidiuretic hormone, kidneys) smooths the blood circulating volume by means of the activation of the antidiuretic and (antinatriuretic) reflexes. The second system (renin, angiotensin, circulation) alters the tone of the smooth muscles of vessels and levels out the gravity hydrostatic effect. These two relatively independent systems are linked through aldosterone because its secretion is also stimulated by angiotensin. The close interaction of the systems, including all their interconnections, makes it possible to define them as the regional functional system in the general antigravity mechanism.

Author

N73-16044 Joint Publications Research Service, Arlington, Va.
EFFECT OF ACCELERATIONS ON THIAMINE-S-35 DISTRIBUTION IN THE BODIES OF WHITE MICE

V. N. Totkiy and L. M. Rovner *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 17-25 refs

The radioactivity of the blood (plasma and formed elements), organs (brain, heart, liver, kidneys, small intestine, spleen) and the subcellular fraction of liver cells of white mice was examined at different intervals following thiamine S-35 injections (1 mg/kg) in normal animals and animals pre-exposed to accelerations (5.5-6 g). Considerable changes in thiamine S-35 distribution within organs, cells and subcellular structures were observed after the exposure. These changes may be caused by disturbances in vitamin metabolism, as well as shifts in the permeability of histohematic barriers, cellular and subcellular membranes.

Author

N73-16045 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN THE JUXTAGLOMERULAR APPARATUS IN THE KIDNEYS OF RATS DURING MULTIHOUR EXPOSURE TO ACCELERATIONS IN DIFFERENT DIRECTIONS

A. S. Pankova *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 26-30 refs

N73-16046

The modified Bovi method was used in estimating the juxtaglomerular index, the dynamics of change in the content of granules in juxtaglomerular cells in the kidneys, using 76 male rats exposed to longitudinal and transverse accelerations of 4 g for 3, 8, 16 and 24 hours. Morphological indications of juxtaglomerular apparatus secretory activity were detected. They were more distinct upon exposure to longitudinal accelerations. The part played by the juxtaglomerular apparatus in the control of hemodynamics and the fluid-electrolyte balance during accelerations is discussed.

Author

N73-16046 Joint Publications Research Service, Arlington, Va.
HEAT REGULATION REACTIONS IN RATS IN A HYPOXIC ATMOSPHERE WITH NITROGEN AND HELIUM DILUTION
G. V. Troshikhin *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 31-37 refs

Thermoregulation reactions (gas exchange, thermoregulation activity of muscles and rectal temperature) of 60 rats exposed for one hour to nitrogen and helium atmospheres containing 20.9, 11.4 and 7.4% oxygen were investigated at 5 = 25 C. In comparison with the controls (breathing air) the test animals exposed in the helium-oxygen (21%) atmosphere exhibited an increase in gas exchange and thermoregulation activity of muscles and a decrease in rectal temperature, thus indicating a cooling effect of helium. Exposure of rats to a hypoxic helium-oxygen (11.4%) atmosphere, as compared with a similar nitrogen-oxygen gas mixture, brought about a less distinct decline in gas exchange and a more marked decrease in body temperature, the thermoregulation tone varying insignificantly and tending to increase in the helium-oxygen atmosphere. Exposure of rats to a hypoxic helium-oxygen (7.4%) atmosphere, as compared with a similar nitrogen-oxygen gas mixture, induced a more noticeable decrease in gas exchange and body temperature, the thermoregulation activity of the muscles changing insignificantly and tending to decrease in the nitrogen-oxygen atmosphere.

Author

N73-16047 Joint Publications Research Service, Arlington, Va.
PATHOGENESIS OF SOME RESPIRATORY AND CIRCULATORY REACTIONS ACCOMPANYING DROPS IN BAROMETRIC PRESSURE
G. B. Bogoslovov *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 38-42 refs

Decompression disease continues to remain a timely problem in high-altitude and space flights. In 44 experiments on dogs the reactions of respiration, blood circulation, gas composition of the blood, and a number of other indices were studied in response to embolism in the pulmonary artery induced by different quantities of nitrogen introduced at different rates (as a model of a decompression gas embolism). Some of the animals were first intravenously injected with Novocaine. A satisfactory tolerance of the animals to a gas embolism was established. In the reactions to gas injection it is not so much the quantity which is of importance as the rate of entry into the lesser circulatory system. The deactivation of vascular interceptors by Novocaine depresses the adaptive compensatory reactions of respiration and circulation developing after injection of the gas and leads to a predominance of symptoms of mechanical impairment of pulmonary circulation.

Author

N73-16048 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN THE TESTES OF DOGS ACCOMPANYING CHRONIC AND COMBINED GAMMA IRRADIATION
G. I. Plakhuta-Plakutina, Ye. A. Savina, and N. L. Fedorova *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 43-51 refs

A study was made of the state of spermatogenesis and sperm production in 36 dogs exposed to chronic (in doses of 21, 62.5 and 125 rad/year) and combined (constant irradiation of 62.5 rad/year and acute radiation in doses of 58 and 126

rad/year) gamma irradiation during the course of the year. The dynamics are described of qualitative and quantitative indices of sperm production during the course of the year and morphological changes in the testicles of dogs in dependence on dose intensity and the nature of irradiation. Suppression and impairment of the spermatogenesis process, combined with a decrease in sperm production indices, was expressed to the greatest degree with combined exposure to chronic and acute irradiation in a dose of 188.5 rad/year; evidence of an increase in the radiosensitivity of tissues in the testes in response to an additional radiation load.

Author

N73-16049 Joint Publications Research Service, Arlington, Va.
EFFECT OF SOME DRUGS ON FALL-OUT AND BEKHTEREV NYSTAGMUS
Ye. L. Epshteyn *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 52-58 refs

Guinea pigs were used in studying the effect of intramuscular injections of drugs on fall-out and Bekhterev nystagmus occurring after unilateral and bilateral labyrinthectomies. In unilaterally labyrinthectomized animals marezine and diphenyldole decreased substantially the frequency of fall-out nystagmus, this being more distinct than in the case of scopolamine. In bilaterally labyrinthectomized animals scopolamine, marezine and metamysil considerably reduced the incidence of nystagmus, this being more significant than in the case of diphenyldole and pediphen. A stage-by-stage investigation of the drug effect on unilateral and bilateral labyrinthectomy models makes it possible to determine specifically the peripheral and central components of each drug.

Author

N73-16050 Joint Publications Research Service, Arlington, Va.
EFFECT OF PROLONGED HYPODYNAMIA ON RAT BIOLOGY
Ye. A. Stroganova *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 59-67 refs

The effect of hypodynamia on the growth and development of offspring was studied in experiments on 36 rats. The test animals were housed in small cages for 62 days before mating. During this period the test animals lagged greatly behind the controls in their weight gain. Following exposure to hypodynamia the test animals changed their sexual behavior. During the first two days in the mating period the females were very aggressive toward the males. This accounted for the fact that the test females littered two or three days later than the controls.

Author

N73-16051 Joint Publications Research Service, Arlington, Va.
RADIATION OXIDATION OF WATER IMPURITIES IN MOISTURE-CONTAINING PRODUCTS OF MAN'S VITAL FUNCTIONS
N. V. Bychkov, A. N. Kasperovich, V. V. Krasnoshchekov, V. P. Plotnikova, Yu. Ye. Sinyak, V. F. Stolbov, S. V. Chizhov, and M. I. Shikina *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 68-73 refs

A radiation method for purifying human wastes from organic impurities in the presence of hydrogen peroxide has been developed. The effect of radiation doses on the oxidation of organic impurities was studied. A toxicological evaluation of regenerated water was made.

Author

N73-16052 Joint Publications Research Service, Arlington, Va.
REGULATION OF VERTICAL POSTURE AFTER FLIGHT ON THE SOYUZ-6 - SOYUZ-8 SHIPS AND 120 DAY HYPOKINESIA
c05
Yu. N. Purakhin, L. I. Kakurin, V. S. Georgiyevskiy, B. N. Petukhov, and V. M. Mikhaylov *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 74-82 refs

Control of erect posture was studied before and after the Soyuz-6 through Soyuz-8 flights (seven cosmonauts) and a 120-day bedrest experiment (ten test subjects). The study was

performed using stabilographic methods and neurological tests: circulation reactions in cosmonauts were also examined. Coordination disturbances were revealed during flight and bedrest experiments. After the flight and experiment they increased and changes in statics and gait appeared. Stabilographic measurements revealed an increase in the amplitude and frequency (especially in the test subjects) of fluctuations of the general body center of mass. The cosmonauts exhibited an increase in pulse rate and arterial pressure. The test subjects also exhibited a pronounced autonomic reaction. These changes were more distinct in the test subjects after the bedrest experiment. Author

N73-16053 Joint Publications Research Service, Arlington, Va.
MECHANICS OF RESPIRATION DURING SIMULATION OF WEIGHTLESSNESS IN AN IMMERSION MEDIUM
M. A. Tikhonov *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 83-87 refs

Changes in lung capacity, air passage resistance and dynamic compliance during water immersion were investigated in six healthy male test subjects. At the beginning of the immersion experiment the functional residual capacity of the lungs decreased by an average of 7% and remained at that level until the end of the experiment. At the onset of the experiment lung compliance also decreased by an average of 20% but tended to recover by the end of immersion. At the beginning of the experiment air passage resistance increased by 65-80% and decreased slightly by the end of immersion. These changes may be caused by shifts in intrathoracic pressure and redistribution of the circulating blood volume. Author

N73-16054 Joint Publications Research Service, Arlington, Va.
ANALYSIS OF SOME MECHANISMS OF MAN'S TOLERANCE TO LOWER BODY DECOMPRESSION
P. M. Suvorov and R. V. Beleda *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 88-93 refs

The objective of the study was to reveal mechanisms underlying individual tolerance of human subjects to lower body negative pressure. Experiments were performed on 40 pilots and 14 test subjects. It was found that the different levels of human tolerance to LBNP of -50 or -77 mm Hg were related mainly to variability of the functional capacity of the human body to maintain arterial tone adequately. A study of catecholamines, their precursors and 17-hydroxycorticosteroids revealed a decline in functional activity of the sympathico-adrenal system and a decrease in adrenal cortex secretion of steroid hormones in subjects exhibiting low LBNP tolerance. These changes seemed to produce a rapid development of their cardiovascular dysfunction during LBNP. Author

N73-16055 Joint Publications Research Service, Arlington, Va.
EFFECT OF A GAS MIXTURE WITH AN INCREASED OXYGEN AND CARBON DIOXIDE CONTENT ON MAN'S ORTHOSTATIC TOLERANCE
V. I. Korolkov, A. A. Savilov, and I. Ya. Lunev *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 94-100 refs

The test subjects were exposed to 10-day bedrest which resulted in a dropoff of orthostatic tolerance. Their exposure to a 95% O₂ - 5% CO₂ atmosphere during a 30-minute tilt test improved orthostatic tolerance, as indicated by hemodynamic parameters, gas composition and blood acid-base equilibrium. Author

N73-16056 Joint Publications Research Service, Arlington, Va.
DIURNAL DYNAMICS OF PSYCHIC PERFORMANCE DURING 72 HOUR CONTINUOUS WAKEFULNESS
A. L. Narinskaya *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 101-108 refs

The results are given of studying variations in the mental performance of ten healthy male test subjects exposed to 72-hour continuous wakefulness. With respect to the different pattern of diurnal variations in mental performance two groups were

distinguished: more rhythmic (four persons) and less rhythmic (six subjects). Author

N73-16057 Joint Publications Research Service, Arlington, Va.
USE OF SODIUM HYDROCARBONATE AS A MEANS FOR TREATING AND PREVENTING MOTION SICKNESS
V. N. Barnatskiy, I. I. Bryanov, R. M. Volosevich, D. P. Komarova, A. G. Kuznetsov, A. T. Poleshchuk, and I. G. Tazetdinov *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 109-117 refs

The effectiveness of intravenous injections of sodium hydrocarbonate as a drug to prevent and treat motion sickness was tested in the laboratory, in clinics and under stormy weather conditions on the high seas. A positive effect of the drug was noted a few days after the injection and it persisted for several months. No pathological symptoms were observed after drug injection. The mechanism of the action of sodium hydrocarbonate during motion sickness still remains obscure and further studies are needed. Author

N73-16058 Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF THE EFFECT OF HIGH MOUNTAIN ALPINISM EXERCISES ON THE HUMAN BODY
G. R. Rung *In its Space Biol. and Med.*, vol. 6, no. 6, 1972 18 Jan. 1973 p 118-128 refs

The results are summarized of a study of 70 alpinists during their high-elevation ascents during 1965-1969. In studies with correction tables for the latent period of the oculomotor reaction, tremometry, strength and static endurance of the hands, and the functional state of the cardiovascular and respiratory systems an insignificant dropoff in these indices was detected during the early stages of high-elevation acclimatization, accompanied by an increase in general tolerance of the human body after a two-month stay in the mountains. Author

N73-16059*# Hardin-Simmons Univ., Abilene, Tex. Dept. of Biology.
A STUDY OF PSYCHROPHILIC ORGANISMS ISOLATED FROM THE MANUFACTURE AND ASSEMBLY AREAS OF SPACECRAFT TO BE USED IN THE VIKING MISSION
Preliminary Report of Planetary Quarantine Activities, 1 Oct. - 31 Dec. 1972
Terry L. Foster and Luther Winans, Jr. Jan. 1973 30 p refs
Presented at the Seminars NASA Spacecraft Sterilization Technol. Seminar, New Orleans, 30-31 Jan. 1973
(Grant NGR-44-095-001)
(NASA-CR-130009) Avail: NTIS HC \$3.50 CSCL 06M

The sampling of soils from the manufacture and assembly areas of the Viking spacecraft is reported and the methodology employed in the analysis of these samples for psychrophilic microorganisms, and temperature studies on these organisms is outlined. Results showing the major types of organisms and the percentage of obligate psychrophiles in each sample are given and discussed. Emphasis in all areas is toward application of these results to the objectives of the planetary quarantine program. Author

N73-16060*# West Florida Univ., Pensacola.
THE USE OF REMOTE SENSORS TO RELATE BIOLOGICAL AND PHYSICAL INDICATORS TO ENVIRONMENTAL AND PUBLIC HEALTH PROBLEMS
Sep. 1972 182 p refs
(Contract NAS9-11872)
(NASA-CR-128727) Avail: NTIS HC \$11.25 CSCL 14B

Relationships between biological, ecological and botanical structures, and disease organisms and their vectors which might be detected and measured by remote sensing are determined. In addition to the use of trees as indicators of disease or potential disease, an attempt is made to identify environmental factors such as soil moisture and soil and water temperatures as they relate to disease or health problems and may be detected by remote sensing. The following three diseases and one major health problem are examined: Malaria, Rocky Mountain spotted

fever, Encephalitis and Red Tide. It is shown that no single species of vascular plant nor any one environmental factor can be used as the indicator of disease or health problems. Entire vegetation types, successional stages and combinations of factors must be used.

Author

N73-16061*# National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

APPARATUS FOR MICROBIOLOGICAL SAMPLING Patent Application

Judd R. Wilkins and Stacey M. Mills, inventors (to NASA) Filed 24 Jan. 1973 14 p
(NASA-Case-LAR-11069-1; US-Patent-Appl-SN-326198) Avail: NTIS HC \$3.00 CSCL 06M

An automatic apparatus for microbiologically sampling surfaces using a cotton swab is reported which eliminates human error normally associated with this process. The apparatus includes a self powered transport device, such as a motor driven wheeled cart, which mounts a swabbing motor drive for a crank arm which supports a swab in the free end thereof. The swabbing motor is pivotally mounted and an actuator rod movable responsive to the cart traveling a predetermined distance provides lifting of the swab from the surface being sampled and reversal of the direction of travel of the cart.

NASA

N73-16062*# Kanner (Leo) Associates, Redwood City, Calif.
ANALYSIS OF ELECTROCARDIOGRAMS OF RHESUS MONKEYS (MACACA MULATTA)

Y. Mu-Chen and S. Chia-Kiang Washington NASA Jan. 1973 21 p refs Transl. into ENGLISH from Sheng Li Hsueh Pao (Peking), v. 27, no. 2, Jun. 1964 p 189-198
(Contract NASw-2481)

(NASA-TT-F-14675) Avail: NTIS HC \$3.25 CSCL 06C

Electrocardiograms were recorded for 107 normal Macaca mulatta monkeys of different age groups and both sexes. Standard, augmented unipolar, and unipolar precordial leads were used with all the animals unanesthetized and in the supine position. Results are as follows: heart rates range from 150 to 273 beats per minute, averaging 215 + or - 6 beats per minute. Conduction speed from pace-marker to ventricle in the monkey heart decreases linearly with increase in heart rate. Most electrical positions of monkey hearts were vertical or semi-vertical. The mean durations of P, QRS, and T waves taken with limb leads are 0.037 + or - 0.014, 0.037 + or - 0.014, and 0.07 + or - 0.004 sec, respectively. A shift of the ST strength was commonly found in the monkeys and appears to be related to their rapid heart rates.

Author

N73-16063*# Linguistic Systems, Inc., Cambridge, Mass.
ON TABLE SALT FEVER

H. Freund Washington NASA Jan. 1973 21 p refs Transl. into ENGLISH from Arch. Exp. Pathol. Pharm. (Leipzig), v. 65, 1913 p 225-338
(Contract NASw-2482)

(NASA-TT-F-14677) Avail: NTIS HC \$3.25 CSCL 06C

Table salt was administered intravenously to rabbits. Using as fever criteria a 0.8 C temperature rise, fever occurred in 88% of the subjects. No immunity to this reaction developed. The fever can be suppressed by Ringer's solution, certain dietary factors, and narcotics. Adrenalin was found to produce analogous effects.

Author

N73-16064*# National Aeronautics and Space Administration, Washington, D.C.

RESULTS OF THE 1971 CORN BLIGHT WATCH EXPERIMENT

Robert B. MacDonald, Richard D. Allen (Dept. of Agr.), Marvin E. Bauer (Purdue Univ.), Joseph W. Clifton (Dept. of Agr.), Jon D. Frickson (Mich. Univ.), and David A. Landgrebe (Purdue Univ.) Lafayette, Ind. Purdue Univ. [1972] 34 p refs Presented at 8th Intern. Symp. on Remote Sensing of Environment, Ann Arbor, Mich., 26 Oct. 1972 Prepared in cooperation with Purdue Univ. Lab. for Applications of Remote Sensing
(Grant NGL-15-005-112)

(NASA-TM-X-69055; LARS-Print-100272) Avail: NTIS HC \$3.75 CSCL 02C

Advanced remote sensing techniques are used to: (1) Detect development and spread of corn leaf blight during the growing season; (2) assess the extent and severity of blight infection; (3) assess the impact of blight on corn production; and (4) estimate the applicability of these techniques to similar situations occurring in the future.

Author

N73-16065*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

SPECTRAL CHARACTERISTICS OF NORMAL AND NUTRIENT-DEFICIENT MAIZE LEAVES

A. H. Al-Abbas, R. Barr, J. D. Hall, F. L. Crane, and M. F. Baumgardner Aug. 1972 22 p refs
(Grant NGL-15-005-112; Contract DA-12-14-100-10292(20); Grants NSF GB-5701; GM-K6-21839; GM-01392)
(NASA-CR-130032; LARS-Print-111472; J-Paper-4839) Avail: NTIS HC \$3.25 CSCL 06F

Reflectance, transmittance and absorbance spectra of normal and six types of mineral-deficient (N,P,K,S,Mg and Ca) maize (*Zea mays L.*) leaves were analyzed at 30 selected wavelengths along the electromagnetic spectrum from 500 to 2600 nm. Chlorophyll content and percent leaf moisture were also determined. Leaf thermograms were obtained for normal, N- and S- deficient leaves. The results of the analysis of variance showed significant differences in reflectance, transmittance and absorbance in the visible wavelengths among leaf numbers 3, 4, and 5, among the seven nutrient treatments, and among the interactions of leaves and treatments. In the reflective infrared wavelengths only treatments produced significant differences. The chlorophyll content of leaves was reduced in all deficiencies in comparison to controls. Percent moisture was increased in S-, Mg- and N- deficiencies. Positive correlation ($r = 0.707$) between moisture content and percent absorption at both 1450 and 1930 nm were obtained. Polynomial regression analysis of leaf thickness and leaf moisture content showed that these two variables were significantly and directly related ($r = 0.894$).

Author

N73-16066*# Union Carbide Research Inst., Tarrytown, N.Y. Environmental Physiology Lab.

PREDICTIVE MODELING OF ALTITUDE DECOMPRESSION SICKNESS IN HUMANS Final Report

David J. Kenyon, Robert W. Hamilton, Jr., Ian A. Colley, and Heinz R. Schreiner 19 Dec. 1972 39 p refs
(Contract NAS2-6697)

(NASA-CR-114550) Avail: NTIS HC \$4.00 CSCL 06S

The coding of data on 2,565 individual human altitude chamber tests is reported as part of a selection procedure designed to eliminate individuals who are highly susceptible to decompression sickness. Individual aircrew members were exposed to the pressure equivalent of 37,000 feet and observed for one hour. Many entries refer to subjects who have been tested two or three times. This data contains a substantial body of statistical information important to the understanding of the mechanisms of altitude decompression sickness and for the computation of improved high altitude operating procedures. Appropriate computer formats and encoding procedures were developed and all 2,565 entries have been converted to these formats and stored on magnetic tape. A gas loading file was produced.

Author

N73-16067*# National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

A HIGH YIELD NEUTRON TARGET FOR CANCER THERAPY

Donald L. Alger and Robert Steinberg 1972 9 p refs Presented at Conf. on Nucl. Instrumentation for Res. and Develop., Miami Beach, Fla., 6-8 Dec. 1972
(NASA-TM-X-68179; E-7271) Avail: NTIS HC \$3.00 CSCL 06E

A rotating target was developed that has the potential for providing an initial yield of 10 to the 13th power neutrons per second by the $T(d,n)He-4$ reaction, and a useable lifetime in excess of 600 hours. This yield and lifetime are indicated for a 300 Kv and 30 mA deuteron accelerator and a 30 microns

thick titanium tritide film formed of the stoichiometric compound TiT₂. The potential for extended lifetime is made possible by incorporating a sputtering electrode that permits use of titanium tritide thicknesses much greater than the deuteron range. The electrode is used to remove in situ depleted titanium layers to expose fresh tritide beneath. The utilization of the rotating target as a source of fast neutrons for cancer therapy is discussed.

Author

N73-16068# Joint Publications Research Service, Arlington, Va.

RHYTHM OF SLEEP AND WAKEFULNESS IN CREWS OF THE SPACESHIPS SOYUZ 3-9 BEFORE, DURING AND AFTER EXPOSURE TO SPACEFLIGHT

A. N. Litsov 7 Feb. 1973 17 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (USSR), no. 6, 1972 p 836-845

(JPRS-58173) Avail: NTIS HC \$3.00 CSCL 06P

Data on the work and rest regimes of crew members of the Soyuz 3 to 9 spaceships in the course of preparations for and implementation of space flight are presented.

Author

N73-16069# Battelle Memorial Inst., Richland, Wash. Pacific Northwest Labs.

ANNUAL REPORT FOR 1971 TO THE USAEC DIVISION OF BIOLOGY AND MEDICINE. VOLUME 2: PHYSICAL SCIENCES. PART 2: RADIOLOGICAL SCIENCES

J. M. Nielsen May 1972 117 p refs
(Contract AT(45-1)-1830)

(BNWL-1651-Vol-2-Pt-2) Avail: NTIS

Brief summaries are presented of work done in the fields of environmental and radiological chemistry, radiation instrumentation, radiation dosimetry, and radiation and health physics. Eighteen separate abstracts were prepared.

NSA

N73-16070# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.

THE EFFECTS OF HYPOXIA AND ACCELERATION ON ENZYME ACTIVITIES IN ERYTHROCYTES AND PLASMA
Ph.D. Thesis - Bonn Univ. [DIE AUSWIRKUNG VON SAUERSTOFFMANGEL UND BESCHLEUNIGUNG AUF EINIGE ENZYMAKTIVITAETEN IM ERYTHROZYTEN UND IM PLASMA]

Ingo Carl Sep. 1972 45 p refs In GERMAN; ENGLISH summary
(DLR-FB-72-71) Avail: NTIS HC \$4.25; DFVLR Porz-Wahn: 13.80 DM

Eleven male subjects were exposed to hypoxia corresponding to an altitude of 6,900 meters and to acceleration of 2.5 + G sub z. Prior to stress and at certain intervals during and after it the number of erythrocytes, hematocrit, and plasma protein concentration were determined. Erythrocytes, hematocrit, and plasma protein increased under both conditions. Under hypoxia the activities of MDH and GOT increased significantly. Under acceleration only the activity of GOT. With the exception of the G-6-PHD activity, which showed a considerable increase under hypoxia, no significant changes could be observed in enzyme activities in erythrocytes under both stresses. Since there is no congruent reaction in the enzyme activities in erythrocytes and plasma, erythrocytes cannot be considered to be a main enzyme source for the plasma level in the ubiquitous cell enzymes. The different responses of the measured blood parameters to both stresses indicate a specific reaction which is dependent on the type of stress.

Author (ESRO)

N73-16071# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

NMR SPECTROSCOPIC AND CALORIMETRIC INVESTIGATION OF RIBONUCLEASE A AND T1 [KMR-SPEKTROSKOPISCHE UND KALORIMETRISCHE UNTERSUCHUNG DER RIBONUKLEASE A UND DER RIBONUKLEASE T1]

H. Rueterjans Bonn Bundeswehramt 1972 160 p refs In GERMAN; ENGLISH summary Sponsored in part by Bundesmin. fuer Verteidigung, und Deut. Forschungsgemeinschaft (BMVg-FBWT-72-7) Avail: NTIS HC \$10.00; Bundeswehramt 25 DM

High resolution nuclear magnetic resonance spectroscopy and calorimetry was applied to ion interaction studies, inhibitors, and substrate analogics with two ribonucleases. The analyses of the functions of histidine residues in the active sites of ribonucleases was found to be relatively easy, since the resonances of the C-2 protons of imidazole rings occur at a downfield range, well separated from all other signals. The chemical shifts of the C-2 proton resonance signals change as the imidazole ring is protonated or deprotonated, so that the pK values of the histidine residues can be measured in a direct manner.

Author (ESRO)

N73-16072# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

ANTIDOTES FOR ALKYL PHOSPHATE POISONING: STRUCTURE-EFFECT RELATIONS IN VIVO AND IN VITRO [ANTIDOTE GEGEN ALKYLPHOSPHATVERGIFTUNG: STRUKTUR-WIRKUNGS-BEZIEHUNGEN IN VIVO UND IN VITRO]

H. Oldiges and K. Schoene Bonn Bundeswehramt 1972 47 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung (BMVg-FBWT-72-8) Avail: NTIS HC \$4.50; Bundeswehramt 25 DM

The protective effects of pyridinium salts were studied for Tabun and Sarin poisoning. The most suitable reactivator for antidote treatment of an alkyl phosphate poisoning is selected. Aging tests were conducted in vitro, with the result of an aging delay in vivo effective substances. The titration of acetyl cholinesterase with Soman is described. The reactivation/rephosphorylation equilibrium and the decay of the phosphoOrloximes were kinetically analyzed.

Author (ESRO)

N73-16073# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

CALORIMETRIC INVESTIGATION OF ENZYMES. THERMODYNAMIC PARAMETER DETERMINATION OF THE INTERACTION BETWEEN RIBONUCLEASE T1 INHIBITORS AND SUBSTRATES [KALORIMETRISCHE UNTERSUCHUNGEN AN ENZYmen. DIE BESTIMMUNG THERMODYNAMISCHER PARAMETER DER WECHSELWIRKUNG VON RIBONUKLEASE T1 MIT INHIBITORN UND SUBSTRATEN]
W. Maurer, W. Haar, and H. Rueterjans Bonn Bundeswehramt 1972 35 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung (FMVg-FBWT-72-12) Avail: NTIS HC \$3.75; Bundeswehramt 25 DM

The enthalpy values were measured for the reaction of several retarding mononucleotides with ribonuclease T1. The thermodynamic parameters for enzyme-inhibitor interactions were obtained from direct calorimetric measurements. The nucleotides were joined to substrates and the order of the retarding effect is described. The thermodynamic parameters were determined for several pH values.

Author (ESRO)

N73-16074# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

NUCLEAR RESONANCE INVESTIGATION OF ENZYMES. PMR SPECTRA OF RIBONUCLEASE INHIBITOR COMPLEXES [KERNRESONANZUNTERSUCHUNGEN AN ENZYmen. PMR-SPEKTREN VON RIBONUKLEASE-INHIBITOR-KOMPLEXEN]

W. Maurer, W. Haar, and H. Rueterjans Bonn Bundeswehramt 1972 46 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung (BMVg-FBWT-72-13) Avail: NTIS HC \$4.50; Bundeswehramt 25 DM

The proton magnetic resonance spectra of ribonuclease A enzyme-inhibitor complexes with nucleotides were studied. From the observed changes in the chemical shifts of histidine and base protons, it was possible to evaluate some aspects of the spatial arrangement of the amino acid side chains, and the conformation of the inhibitors in the active site. The results are discussed with regard to catalytic action. Author (ESRO)

N73-16075# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

PHARMACOLOGICAL INVESTIGATION OF THE PARASYMPATHOLYTICAL EFFECT OF MONO AND BISQUATERNARY PYRIDINIUM COMPOUNDS ON THE ISOLATED GUINEA PIG ILEUM [PHARMAKOLOGISCHE UNTERSUCHUNGEN UEBER DEN MECHANISMUS DER PARASYMPATHOLYTISCHEN WIRKUNG MONO- UND BISQUATERNÄRER PYRIDINIUMVERBIDUNGEN AUF DAS ISOLIERTE ILEUM DES MEERSCHWEINCHENS]

D. Kuhnen-Claussen Bonn Bundeswehramt 1972 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-14) Avail: NTIS HC \$4.25; Bundeswehramt 25 DM

The antagonistic effects were investigated in mono- and bisquaternary pyridinium compounds on muscarinic agonists of the isolated guinea pig ileum. The influence of the experimental technique, the incubation time, and the receptor reserve were analyzed. The compounds have parasympatholytic, antimuscarinic effects. The affinity to the receptor is greater in presence of 4 pyridinium aldoxime-substituted than that of unsubstituted, 2-isomer or nicotinamide compounds. The molecular pharmacological mechanism of the antagonistic action of the compounds is discussed. Author (ESRO)

N73-16076# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

SKIN PROTECTION AGAINST HIGH TOXIC PHOSPHORIC ACID ESTERS [UNTERSUCHUNGEN ZU EINEM HAUTSCHUTZ GEGENUEBER HOCHTOXISCHEN PHOSPHORSAURE-ESTERN]

G. Schreiber Bonn Bundeswehramt 1972 55 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-15) Avail: NTIS HC \$4.75; Bundeswehramt 25 DM

The penetration of a highly toxic alkyl phosphate (diisopropyl fluoro phosphate), DFP, 10% w/v in n-tripropyl phosphate through unprotected and coated pig skin (with 23 barrier creams) was investigated in a penetration chamber. The drug was detected enzymatically (cholinesterase inhibition). The comparative study showed inhibited skin penetration of the drug for 14 of the barrier creams and increased penetration for 9. Materials, methods, and results are discussed. Further development of an improved barrier cream against highly toxic alkyl phosphates is suggested. Author (ESRO)

N73-16077# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

BIOLOGICAL EFFECTS OF FAST NEUTRONS. MORTALITY AND CHANGES IN BLOOD CELL COUNT OF MICE AFTER COMPLETE EXPOSURE TO FAST NEUTRONS AND X-RAYS [BIOLOGISCHE WIRKUNG SCHNELLER NEUTRONEN. MORTALITAET UND VERAENDERUNGEN IM BLUTBILD VON MAEUSEN NACH GANSKOERPERBESTRAHLUNG MIT SCHNELLEN NEUTRONEN UND ROENTGENSTRÄHLEN]

F. J. Otto Bonn Bundeswehramt 1972 34 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-16) Avail: NTIS HC \$3.75; Bundeswehramt 25 DM

The biological effects of fast neutrons in the energy range 2 to 6 MeV were studied in mice and compared with the effects of X-rays. The total mortality after 30 days, the mortality patterns, and the changes in blood cell count were examined. After neutron irradiation death occurs earlier and the variations in death time are greater than after X-irradiation. The decrease of lymphocyte number 48 hours after irradiation shows a linear relation to dose logarithm. Lymphocyte number as a measure of radiation damage is found to be reliable and useful over a wide dose range. The relative biological effectiveness of neutrons in lymphocyte decrease is 2.0 after low doses and 1.4 after high doses. The number of reticulocytes decreases 48 hours after neutron irradiation. Author (ESRO)

N73-16078# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE ACUTE TOXICITY OF CHLORINE-PENTAFLUORIDE

Kenneth I Darmer, Jr. Dec. 1971 12 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by the SysteMed Corp., Dayton, Ohio (AF Proj. 6302)

(AD-751452; AMRL-TR-71-120-Paper-21) Avail: NTIS CSCL 06/20

The present study was undertaken to obtain symptomatic and pathological information resulting from acute exposure to ClF₅ gas, and to determine the LC(50) values for exposure of rats, mice, dogs, and monkeys for 15, 30, and 60 minutes.

GRA

N73-16079# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE TOXICOLOGY OF SOME COMMERCIAL FLUOROCARBONS

Richard S. Waritz Dec. 1971 17 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp. (AF Proj. 6302)

(AD-751429; AMRL-TR-71-120-Paper-7) Avail: NTIS CSCL 06/2

The field of fluorocarbon toxicology is a very fascinating toxicological area. Except for the field of natural products such as amino acids and carbohydrates, it contains some of the best examples of extreme variations of biological activity accompanying seemingly minor structural variations. The report discusses these variations and the toxicology of various compounds. GRA

N73-16080# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE TOXICITY OF PYROLYSIS PRODUCTS FROM A CHLOROTRIFLUOROETHYLENE-ETHYLENE COPOLYMER (HALAR RESIN)

Lester D. Scheel (PHS, Cincinnati), A. B. Robertson (Allied Chem. Corp., Morristown, N. J.), Richard E. Kupel (PHS, Cincinnati), Charles V. Cooper (PHS, Cincinnati), William P. Tolos (PHS, Cincinnati), Louis Vignati (PHS, Cincinnati), and Donald E. Richards (PHS, Cincinnati) Dec. 1971 27 p refs Presented at Ann. Conf. on Environ. Toxicol. (2d), Fairborn, Ohio, 31 Aug. and 1-2 Sep. 1971; sponsored by SysteMed Corp. (AD-751436; AMRL-TR-71-120-Paper-14) Avail: NTIS CSCL 06/20

Halar (Trademark of the Allied Chemical Corporation), a new copolymer of chlorotrifluoroethylene (CTFE) and ethylene having a 50/50 mole ratio and a high degree of one-to-one alternation, offers an attractive combination of properties. The structure elucidation of poly CTFE-E is described. The products formed when poly CTFE-E undergoes the inhalation of those pyrolysis products have also been studied. GRA

N73-16081# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

DICHLOROMETHANE HEPATOTOXICITY IN MICE WITH CONTINUOUS AND INTERMITTENT INHALATION EXPOSURES

Ronald S. Weinstein, Dale D. Boyd, and Kenneth C. Back Dec.

1971 40 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751434; AMRL-TR-71-120-Paper-12) Avail: NTIS CSCL 06/20

Few guidelines exist for establishing acceptable exposure levels for continuous exposures to toxic substances on the basis of data obtained from single or intermittent exposure experiments. In this study, the effects of continuous inhalation of CH₂Cl₂ on mice were examined in detail with respect to liver changes. The effects of continuous CH₂Cl₂ exposures are of particular interest since CH₂Cl₂ is present in space cabin construction materials and may be present in trace amounts in the atmosphere of space cabins. A comparison of the effects produced by continuous exposure with those of intermittent exposures should help in extrapolating and predicting effects and results of continuous exposures from data on intermittent exposures.

GRA

N73-16082# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

EFFECTS OF METHYLENE CHLORIDE EXPOSURE ON THE SPONTANEOUS ACTIVITY OF MICE

Anthony A. Thomas, Mildred K. Pinkerton, and James A. Warden Dec. 1971 7 p ref Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751435; AMRL-TR-71-120-Paper-13) Avail: NTIS CSCL 06/20

The experiments described were conducted during continuous exposure of mice to methylene chloride (dichloromethane). The group exposed to 5000 ppm methylene chloride was severely affected and by the seventh day 50% of the mice died. The 1000 ppm exposed group survived the entire four weeks and the spontaneous activity findings are presented. Results indicate that there is a definite trend toward lower activity during exposure, and when one compares the first two-week exposure period with the second two-week exposure period, activity seems to be stabilized at a considerably lower level.

GRA

N73-16083# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

PATHOLOGICAL LESIONS CAUSED BY METHYLISOBUTYLKETONE

William F. MacKenzie Dec. 1971 14 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751444; AMRL-TR-71-120-Paper-23) Avail: NTIS CSCL 06/20

The lesions caused by methylisobutylketone (MIBK) were interesting in that they were found only in one species, the rat, and in that species were limited to a specific part on one organ - the first and second sections of the proximal convoluted tubule of the nephron of the kidney. This lesion was designated hyaline droplet toxic tubular nephrosis, although in some respects it differed from the classic concept of hyaline droplet formation. The lesion was present at 14 days of exposure and continued with a variable decrease in severity throughout the exposure. In those rats removed for serial sacrifice at weekly intervals from the second week to the end of the exposure, the lesion completely reversed between the third and fourth weeks postexposure.

GRA

N73-16084# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

GUIDES FOR SHORT-TERM EXPOSURES OF THE PUBLIC TO AIR POLLUTANTS

Frank G. Favorite, Lawrence M. Roslinski, and Ralph C. Wands Dec. 1971 7 p ref Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF-6302)

(AD-751438; AMRL-TR-71-120-Paper-16) Avail: NTIS CSCL 13/2

The short-term exposure limits for three air pollutants - nitrogen oxides, hydrogen chloride, and hydrogen fluoride - as determined by the National Academy of Sciences, are presented.

GRA

N73-16085# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE ACUTE TOXICITY OF BRIEF EXPOSURES TO HYDROGEN FLUORIDE, HYDROGEN CHLORIDE, NITROGEN DIOXIDE, AND HYDROGEN CYANIDE SINGLY AND IN COMBINATION WITH CARBON MONOXIDE

L. C. DiPasquale and H. V. Davis (Standard Oil of Ill., Chicago) Dec. 1971 14 p refs Presented at the 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp., Dayton, Ohio
(AD-751442; AMRL-TR-71-120-Paper-20) Avail: NTIS CSCL 06/20

Many of the common plastic and rubber formulations in widespread use as aircraft cabin materials represent potential hazards in the event of fire aboard an aircraft. For example, polyurethane foams contain diisocyanate, fluorinated and chlorinated hydrocarbons, in addition to various aliphatic amines. When subjected to the high temperatures of combustion, the pyro-decomposition products formed would include hydrogen chloride (HCl), hydrogen fluoride (HF), hydrogen cyanide (HCN), and nitrogen dioxide (NO₂) gases. Because of the inadequacy of available information regarding toxicity of these gases under very brief exposure conditions, animal experiments were conducted using these compounds, both singly and in combination with carbon monoxide (CO), to determine five-minute LC(50) values. It was important to see just what, if any, effect the (CO) would have on the toxicity of these several compounds.

GRA

N73-16086# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

ANIMAL PATHOLOGY RESULTING FROM LONG TERM EXPOSURE TO LOW LEVELS OF MONOMETHYLHYDRAZINE

D. J. Kroe Dec. 1971 10 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751441; AMRL-TR-71-120-Paper-19) Avail: NTIS CSCL 06/20

The present experiments were designed to pursue investigation of the toxic effects of intermittent or continuous chronic exposure of monkeys, dogs, rats, and mice to lower levels of environmental MMH. These experiments demonstrated that continuous exposure of monkeys or rats at a concentration of 0.2 ppm MMH does not induce histopathological lesions at the light microscopic level. The same exposure levels and exposure periods do induce pathological lesions in livers and kidneys of dogs and rats, kidneys, and spleens of mice. Mice show hepatic, splenic, and renal tubular hemosiderosis under all conditions of exposure to MMH; however, the degree of hemosiderosis shows a dose related pattern. The fact that the MMH exposure conditions of these experiments induce histopathological changes in dogs and mice but not in monkeys and rats is most probably explained by species susceptibility to MMH induced hemolysis and species capability for clearing the products of hemolysis. Lymphoid hyperplasia was noted in some exposed dogs; however, the limited sampling precludes definitive interpretation of this observation. The present experiments do not indicate a zero-toxicity MMH exposure level for dogs and mice. The experiments do demonstrate a striking difference in species susceptibility to MMH toxicity, and indicate tissue zero-toxicity levels for monkeys and rats as evaluated by light microscopy.

GRA

N73-16087# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

CHRONIC EXPOSURE STUDIES WITH MONO-

N73-16088

METHYLHYDRAZINE

J. D. MacEwen and C. C. Haun Dec. 1971 18 p refs Presented at the 2nd Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971, sponsored by SysteMed Corp. (AD-751440; AMRL-TR-71-120-Paper-18) Avail: NTIS CSCL 06/20

The manufacture and use of monomethylhydrazine (MMH) as a rocket fuel has increased over the past 10 years. The acute health hazards from handling this highly reactive compound are well defined, but although its usage is increasing little is known about its chronic exposure effects. The current industrial threshold limit value (TLV) of 0.2 ppm was established by analogy with hydrazine and unsymmetrical dimethylhydrazine. A series of 6-month MMH chronic exposures to four animal species was undertaken to evaluate the safety factor and appropriateness of the current TLV for health of workmen. The results of these experiments showed that MMH produces a dose-related hemolytic anemia with Heinz body formation for which there appears to be no threshold effect level. The anemia is reversible with removal from further exposure at least up to a level of 5 ppm intermittent exposure. For use in establishing continuous exposure limits for confined spaces such as missile silos, consideration should be given to variations in concentration which could considerably shift the exposed people down the effect curve. Consideration should also be given to the effect of MMH on people with preexisting blood dyscrasias or hemolytic traits. GRA

N73-16088# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

BASIS FOR ESTABLISHING GUIDES FOR SHORT TERM EXPOSURE OF THE PUBLIC TO AIR POLLUTANTS

Ralph C. Wands, Frank G. Favorite, and Lawrence M. Roslinski Dec. 1971 8 p refs Presented at the 2nd Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp. Dayton Ohio (AD-751437; AMRL-TR-71-120-Paper-15) Avail: NTIS CSCL 13/2

The report describes the work of the Committee on Toxicology of the National Research Council in setting up short term exposure limits for air pollutants. GRA

N73-16089# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

CARDIOPULMONARY EFFECTS OF FLUOROCARBON COMPOUNDS

Domingo M. Aviado Dec. 1971 11 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.

(AF Proj. 6302) (AD-751426; AMRL-TR-71-120-Paper-4) Avail: NTIS CSCL 06/20

The present investigation was designed to examine the hypothesis that the cardiopulmonary toxicity of the propellants is related to the irritation of sensory receptors in the respiratory passages. The anesthetized dog was used to allow measurement of pulmonary resistance and compliance, when propellants were confined to the upper respiratory tract or were administered intratracheally, bypassing the upper respiratory tract. Additional procedures to determine whether propellants influence the bronchial smooth muscle, pulmonary blood vessels and the heart are reported. Three propellants commonly used in aerosol units containing bronchodilators were investigated. They are trichlorofluoromethane (propellant 11), dichlorodifluoromethane (propellant 12), and 1,2-dichloro-1,1,2,2-tetrafluoroethane (propellant 114). GRA

N73-16090# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

CARDIAC TOXICITY OF AEROSOL PROPELLANTS

Willard S. Harris Dec. 1971 10 p refs Presented at 2d Ann. Conf. Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.

(AF Proj. 6302) (AD-751425; AMRL-TR-71-120-Paper-3) Avail: NTIS CSCL 06/20

The fluoroalkane gases used to propel aerosols sensitize the hearts of mice to asphyxia-induced sinus bradycardia, atrioventricular block and T-wave depression, quickly enter the blood of monkeys, cats and dogs after inhalation and, despite adequate oxygenation, have a spectrum of cardiovascular toxic effects; for example, directly depressing contractility in rat, cat, dog and human myocardium and rapidly inducing ventricular arrhythmias in awake or anesthetized monkeys. The relevance of these findings to sudden unexpected death in young people who deliberately inhale these gases, to the widespread use of household and cosmetic aerosols, which most commonly discharge as propellants, Freons 12, 11 and 114, and perhaps, to the increasing uses of other Freons (e.g., the solvent, Freon 113), makes deeper study of this toxicity mandatory. Author (GRA)

N73-16091# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

CARDIOVASCULAR EFFECTS OF FLUOROCARBON EXPOSURE

Alex Azar (Du Pont de Nemours (E. I.) and Co., Wilmington, Del.) Dec. 1971 31 p refs Presented at 2nd Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.

(AF Proj. 6302) (AD-751427; AMRL-TR-71-120-Paper-5) Avail: NTIS CSCL 06/20

The report reviews studies which have shown that certain fluorinated hydrocarbon compounds are capable of sensitizing the mammalian heart to epinephrine resulting in serious cardiac arrhythmias. This phenomenon is referred to as cardiac sensitization. GRA

N73-16092# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

EFFECTS OF MONOMETHYLHYDRAZINE ON BLOOD AND CEREBROSPINAL FLUID GLUCOSE IN ANESTHETIZED MONKEYS

Bennett A. Shaywitz, William T. Gormley, Marilyn E. George, and Kenneth C. Back Jun. 1972 18 p refs

(AF Proj. 6302) (AD-751232; AMRL-TR-71-122) Avail: NTIS CSCL 06/20

Plasma and CSF glucose was investigated in fasted, pentobarbital anesthetized rhesus monkeys given monomethylhydrazine (MMH) 25 mg/kg i.v. Glucose was determined by the glucose oxidase method. Fasting blood glucose and CSF glucose in mg % averaged 48.8 plus or minus 2.5 (S.E.) and 45.1 plus or minus 2.9 (S.E.) respectively. The CSF/blood ratio of 0.923 is similar to that reported for dogs but differs from the ratio of 0.6 for humans. Following MMH, both blood and CSF glucose increased to 90.6 plus or minus 8.0 and 63.8 plus or minus 5.5 mg % respectively and the CSF/blood ratio decreased to 0.704. Formation of CSF averaged 0.028 and 0.035 ml/min before and after MMH respectively. Convulsions occurred in half the monkeys 120 minutes after MMH, a time when both blood and CSF glucose were elevated. Author (GRA)

N73-16093*# Southwest Research Inst., San Antonio, Tex. Biomedical Applications Team.

SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM Monthly Report, 1-31 Dec. 1972

31 Dec. 1972 84 p refs

(Contract NASW-1867; SwRI Proj. 13-2538) (NASA-CR-130022) Avail: NTIS HC \$6.25 CSCL 06B

The problem statements presented relate mostly to research on prosthetic equipment and means of attaching biomedical and electronic devices to the human body. A patent application for a reliable switching element in a patient assist control unit is also described.

G.G.

N73-16094*# AiResearch Mfg. Co., Los Angeles, Calif. TEKTITE 2 HABITABILITY RESEARCH PROGRAM: DAY-TO-DAY LIFE IN THE HABITAT

D. P. Nowlis 30 Mar. 1972 130 p

(Contract NAS8-25100)

(NASA-CR-130034; Rept-71-6192-2) Avail: NTIS HC \$8.50 CSCL 05E

Because it is widely agreed that the field of environmental psychology is quite young, it was determined that a sample of recorded observations from a representative mission should be included in the report on Tektite to give the professional reader a better feeling of normal day-to-day life in the isolated habitat. Names of the crew members have been replaced with numbers and some off-color words have been replaced by more acceptable slang; some remarks have been omitted that might lead to easy identification of the subjects. Otherwise, the following pages are exactly as transcribed during the late afternoons and the evenings of the mission.

Author

N73-16095*# Geoscience, Ltd., Solana Beach, Calif.
A URINE VOLUME MEASUREMENT SYSTEM Final Report,
 29 Apr. 1971 - 31 Dec. 1972
 H. F. Poppendiek, G. Mouritzen, and C. M. Sabin Dec. 1972
 47 p refs
 (Contract NAS-9-11612)
 (NASA-CR-128726; GLR-113) Avail: NTIS HC \$4.50 CSCL 06B

An improved urine volume measurement system for use in the unusual environment of manned space flight is reported. The system utilizes a low time-constant thermal flowmeter. The time integral of the transient response of the flowmeter gives the urine volume during a void as it occurs. In addition, the two phase flows through the flowmeter present no problem. Developments of the thermal flowmeter and a verification of the predicted performance characteristics are summarized.

Author

N73-16096*# National Aeronautics and Space Administration.
 Langley Research Center, Langley Station, Va.
AUTOMATIC INOCULATING APPARATUS Patent Application
 Judd R. Wilkins and Stacey M. Mills, inventors (to NASA) Filed 24 Jan. 1973 19 p
 (NASA-Case-LAR-11074-1; US-Patent-Appl-SN-326364) Avail: NTIS HC \$3.00 CSCL 06B

An automatic inoculating apparatus for agar trays is reported that uses a simple inoculating element such as a cotton swab or inoculating loop. The apparatus includes a movable carriage for supporting the tray to be inoculated, a drive motor for moving the tray along a trackway and a swabbing motor for automatically swabbing the tray during movement. An actuator motor controls lowering and lifting of the inoculating element. An electrical control system including limit microswitches enables automatic control of the actuator motor and return of the carriage to the initial position after inoculating is completed. NASA

N73-16097*# National Aeronautics and Space Administration.
 Lewis Research Center, Cleveland, Ohio.
A METHOD FOR DEFINING DOWN-WIND EVACUATION AREAS FOR TRANSPORTATION ACCIDENTS INVOLVING TOXIC PROPELLANT SPILLS
 R. D. Siewert 1972 15 p refs Presented at 1972 Joint Army Navy NASA AF (JANNAF) Prop. Meeting, New Orleans, La., 27-29 Nov. 1972
 (NASA-TM-X-68188; E-7320) Avail: NTIS HC \$3.00 CSCL 13B

Evacuation areas for accidental spills of toxic propellants along rail and highway shipping routes are defined to help local authorities reduce risks to people from excessive vapor concentrations. These criteria along with other emergency information are shown in propellant spill cards. The evacuation areas are based on current best estimates of propellant evaporation rates from various areas of spill puddles. These rates are used together with a continuous point-source, bi-normal model of plume dispersion. The rate at which the toxic plume disperses is based on a neutral atmospheric condition. This condition, which results in slow plume dispersion, represents the widest range of weather parameters which could occur during the day and nighttime periods. Evacuation areas are defined by the ground level boundaries of the plume within which the concentrations exceed

the toxic Threshold Limit Value (TLV) or in some cases the Emergency Exposure Limit (EEL).

Author

N73-16098# Royal Aircraft Establishment, Farnborough (England).

THE EFFECT OF HANDEDNESS ON A TRACKING TASK

R. V. Wilson Aug. 1972 26 p refs

(RAE-TR-72117; BR-31173) Avail: NTIS HC \$3.50

Eight male right-handed subjects performed a total of twelve 3-minute runs on a compensatory tracking task. The subjects were divided into two groups matched for handedness. One group performed the first six runs with the preferred (right) hand while the other group used the non-preferred (left) hand. For the remaining six runs the two groups used their other hand. No significant differences were found between performance with the two hands. Performance with the hand utilized in the second half of the experiment was significantly better than that used in the first half. The results of the experiment are further examined in terms of the learning phenomena normally associated with the acquisition of psychomotor skills. The absence of both unilateral and bilateral reminiscence effects is discussed.

Author (ESRO)

N73-16099# Royal Aircraft Establishment, Farnborough (England).

A PROJECTED GRID METHOD FOR RECORDING THE SHAPE OF THE HUMAN FACE

J. Cobb Mar. 1972 33 p refs

(RAE-TR-71184; BR-28791) Avail: NTIS HC \$3.75

The work carried out to design equipment is described which would quickly and cheaply record the shapes of a large number of human faces. It is intended for use in an anthropometric survey with a view to providing data for a project aimed at improving the fit and comfort of oxygen masks for service use. The data is examined to discover a parameter of the human face which can be used to determine which mask size is best suited to any individual. A simple, quick, and adequately accurate equipment for recording one side of the face was developed from an earlier design and includes several refinements to simplify the analysis. The survey will assume that the mean aircrew face is symmetrical although it is realized that individual faces are not. The accuracy of the equipment was measured and is within the required one millimeter.

Author (ESRO)

N73-16100# Southampton Univ. (England). Inst. of Sound and Vibration Research.

THE TRANSMISSION OF TRIAXIAL VIBRATION TO PILOTS IN THE SCOUT AH Mk1 HELICOPTER

M. J. Griffin Aug. 1972 82 p refs

(ISVR-TR-58) Avail: NTIS HC \$6.25

Three experiments designed to determine the triaxial vibration experienced by pilots in the P-531 (Scout) helicopter are described. In the first experiment, eight Scout helicopters were flown by the same pilot in seven different flight conditions. In each condition, the mean and range of floor vibration were determined at frequencies of maximum vibration for each of three perpendicular axes. In the other two experiments, eight pilots flew in a single Scout helicopter with known floor vibration characteristics. The spectra of triaxial head vibration during four flight conditions were determined from trial two. In trial three, vertical vibration at the heads and at the interface between their bodies and the seat cushion were determined during the hover. The vibration data obtained from the three experiments are presented together with detailed consideration of the differences in vibration level associated with the different flight conditions, vibration axes, helicopters, and pilots.

Author (ESRO)

N73-16101# Bunker-Ramo Corp., Westlake Village, Calif.
 Electronic Systems Div.

TRAINING EFFECTIVENESS EVALUATION OF NAVAL TRAINING DEVICES. PART 1: A STUDY OF THE EFFECTIVENESS OF A CARRIER AIR TRAFFIC CONTROL CENTER TRAINING DEVICE Final Report, Jun. 1970 - Apr. 1971

N73-16102

Dorothy L. Finley, Thomas W. Rheinlander, Ernest A. Thompson, and Dennis J. Sullivan Aug. 1972 116 p refs
(Contract N61339-70-C-0258)
(AD-751556; NAVTRADEV CEN-70-C-0258-1-Pt-1) Avail:
NTIS CSCL 05/9

The study evaluated the effectiveness of the Carrier Air Traffic Control Center (CATCC) training device in training teams to safely and efficiently control aircraft recoveries and to effectively maintain communications necessary to implement this control function. The results indicate the device is quite effective in that team, subteam, and individual performances generally improve during training, that student capability to deal with recovery contingencies and emergencies improves, that students generally perform acceptably in the operational job setting, that empirical evidence supports (but does not prove due to the study design) the transfer of training hypothesis, and that students gave the device moderate to high ratings on realism and effectiveness characteristics. It was concluded that device effectiveness could be further improved and that recommendations were worth consideration due to the considerable impact CATCC has on the efficiency and safety of carrier recovery operations.

Author (GRA)

N73-16102# School of Aerospace Medicine, Brooks AFB, Tex.
HUMAN FACTORS EVALUATION OF LASER PROTECTIVE VISORS Final Report, May 1971 - May 1972
William R. Thursby, Jr., Robert G. Braun, and Albert V. Alder Sep. 1972 16 p refs
(AD-751470; SAM-TR-72-23) Avail: NTIS CSCL 06/17

Three laser protective visors and a spectacle-goggle were evaluated by over 100 experienced, rated aircrew members under flight and simulated flight conditions to determine if use of such protective filters would unduly degrade performance of flying duties. Two of the visors and the spectacle-goggle were multiwavelength protective devices. The orange and blue visors provided multiwavelength protection for complementary parts of the near ultraviolet, visible, and the near infrared portions of the electromagnetic spectrum, and the spectacle-goggle essentially combined the protective capability of these visors into one unit. The yellow visor afforded protection specifically against neodymium laser light.

Author (GRA)

N73-16103# Air Force Human Resources Lab., Brooks AFB, Tex. Advanced Systems Div.
EVALUATION OF A DEVICE TO TRAIN FORWARD AIR CONTROLLERS TO COMMUNICATE TARGET LOCATIONS Final Report, 1 Aug. 1971 - 15 Mar. 1972
Horace H. Valverde, William J. Woods (Air Ground Operations School, Hurlburt Field, Fla.), and Ned H. Kearns (Systems Res. Labs., Inc., Dayton, Ohio) May 1972 56 p refs
(AF Proj. 1710)
(AD-751292; AFHRL-TR-72-12) Avail: NTIS CSCL 05/9

The report describes the development and evaluation of a forward air controller (FAC) and tactical strike pilot (TAC) trainer. The trainer was designed to permit a FAC and a TAC to practice the tasks of communicating the location of targets. A previous analysis of communications between FAC and TAC personnel during actual combat had revealed that the task of verbalizing imagery (describing what one is seeing) was especially difficult and important to the success of the FAC/TAC mission. Subjects for the evaluation consisted of 35 Air Force pilots selected to be trained as forward air controllers at Hurlburt Field, Florida.

Author (GRA)

N73-16104# Army Missile Command, Redstone Arsenal, Ala. Guidance and Control Directorate.
THE DESIGN OF ANALYSIS OF A HUMAN BODY MOTION MEASUREMENT SYSTEM

L. Jack Little Sep. 1972 94 p refs
(DA Proj. 1X2-22251-D-231)
(AD-751134; RG-TR-72-19) Avail: NTIS CSCL 05/5

No adequate systems were found in a literature search that would permit direct measurement of human body segments' angular acceleration and muscle forces related to these accelerations which would allow application of analytic mechanics to the human motion problem. Therefore, a new system was designed

and analyzed to provide accurate measurement of the body segments' motion directly by use of angular accelerometers. The basic elements of the system are the accelerometers, all electromyogram sensors, and a proportional bandwidth telemetry system that allows the human performer to move about freely. Verification of the system was accomplished by measurement of angular accelerations of the arm and leg links during kip-up maneuvers. Alignment of the accelerometers was achieved by an optical laser technique. The acceleration signals, stored on magnetic tape, were subsequently integrated to get rate and position in an inertial reference frame. These position data, obtained through integration, proved to be insufficiently accurate when compared with synchronized position data obtained from high speed motion picture film data. . Author (GRA)

N73-16105# Florida Univ., Gainesville. Dept. of Electrical Engineering.

QUANTITATIVE ANALYSIS OF THE PHYSIOLOGICAL CONDITION AND LEVEL OF ALERTNESS OF MAN IN AN ISOLATED ENVIRONMENT Annual Report

Jack R. Smith 2 Nov. 1972 6 p
(Grant AF-AFOSR-2171-72; AF Proj. 9777)
(AD-751272; AFOSR-72-2058TR) Avail: NTIS CSCL 05/10

The report discusses the design and fabrication of the electronic detectors necessary for analyzing an animal EEG and the software for computer processing of the data. Although analysis of human EEG's is not completed, it has been noted that monitoring the high frequencies present in the frontal channels provides a good indicator of whether or not the subject is awake. The activity appears to provide a more sensitive indicator of alertness than does alpha activity.

Author (GRA)

N73-16396* Geological Survey, Washington, D.C.
APPLICATION OF REMOTE SENSING TECHNIQUES FOR APPRAISING CHANGES IN WILDLIFE HABITAT
Harvey K. Nelson (Northern Prairie Wildlife Res. Center), A. T. Klett (Northern Prairie Wildlife Res. Center), and John E. Johnston /n NASA, Washington. Intern. Workshop on Earth Resources Surv. Systems, Vol. 2 1971 p 260-288 refs

CSCL 02E

N73-17010 Royal Aircraft Establishment, Farnborough (England). Human Engineering Div.

PILOT WORKLOAD: A CONCEPTUAL MODEL
R. G. Thorne /n AGARD Stability and Control Nov. 1972 6 p

N73-17047# Research Triangle Inst., Research Triangle Park, N.C.

APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report, Sep. 1971 - Aug. 1972

F. T. Wooten 31 Aug. 1972 124 p
(Contract NASW-2273)
(NASA-CR-130544) Avail: NTIS HC \$8.25 CSCL 06E

The results are presented of the medically related activities of the NASA Application Team Program at the Research Triangle Institute. The accomplishments of the Research Triangle Institute Application Team during the reporting period are as follows: The team has identified 44 new problems for investigation, has accomplished 8 technology applications and 8 potential technology applications, has closed 88 old problems, and reactivated 3 old problems, and on August 31, 1972, has a total of 57 problems under active investigation.

Author

N73-17048# National Aeronautics and Space Administration, Washington, D.C.

PROCEEDINGS OF THE ANNUAL CONFERENCE OF NASA CLINIC DIRECTORS, ENVIRONMENTAL HEALTH OFFICIALS AND MEDICAL PROGRAM ADVISORS

1969 169 p refs Conf. held at New Orleans, 21-23 Oct. 1969
(NASA-TM-X-69072) Avail: NTIS HC \$10.50 CSCL 06E

The current status of the NASA Occupational Medicine and Environmental Health Program is discussed with emphasis on periodic physical examinations and continuous updating of medical history questionnaires for preventing health and emotional problems.

N73-17049* Radio Corp. of America, Camden, N.J.
APOLLO 11 IMPACT ON THE OCCUPATIONAL MEDICINE PROGRAM, NASA MANNED SPACECRAFT CENTER
 Paul E. Wright *In NASA*, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 1-3
 (Contract NAS9-6568)
 CSCL 061

Requirements and development of standards for occupational medicine support of personnel in the Lunar Receiving Laboratory (LRL) are outlined. Considered are proper personnel performance and exclusion of people prone to develop a serious illness within the quarantine area. Occupational medicine report for the LRL consists of examination procedures covering laboratory work, periodic examinations, immunizations, health maintenance, preventive practices, medical standards, and waiver authority.

G.G.

N73-17050* National Aeronautics and Space Administration, Washington, D.C.
MEDICAL EXAMINATIONS FOR RADIATION WORKERS
 R. E. Alexander *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1969 p 4-9 refs
 CSCL 04R

The NASA radiological protection policy allows an employee to be assigned work in a radiologically controlled area only if all of the following conditions are met: (1) The area must be radiologically safe for the intended operations; (2) the employee must be medically fit; (3) the employee must be properly trained; (4) appropriate radiation protection procedures must be prepared; (5) appropriate dosimetric, survey, surveillance and reporting procedures must be implemented; and (6) adequate controls and records must be established.

Author

N73-17051* Cox Coronary Heart Inst., Dayton, Ohio.
EXPERIENCES WITH PHYSICAL CONDITIONING PROGRAMS IN MIDDLE-AGED MEN
 Benjamin Schuster and Edwin Stanley *In NASA*, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 10-15

CSCL 06P

Long term effects of physical exercise and conditioning in the prevention and treatment of coronary heart disease are studied. Some aspects of the problem are outlined and difficulties encountered in a group of middle aged business executives using a carefully prescribed, but non-regimented and loosely supervised conditioning program employing commonly used forms of exercise (bicycling and jogging), are described.

Author

N73-17052* National Aeronautics and Space Administration, Washington, D.C.
EXPERIENCE FACTORS IN PERFORMING PERIODIC PHYSICAL EVALUATIONS
 Archie A. Hoffman *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1969 p 16-22 refs
 CSCL 06P

The lack of scientific basis in the so-called periodic health examinations on military personnel inclusive of the Executive Health Program is outlined. This latter program can well represent a management tool of the company involved in addition to being a status symbol. A multiphasic screening technique is proposed in conjunction with an automated medical history questionnaire for preventive occupational medicine methodology. The need to collate early sickness consultation or clinic visit histories with screening techniques is emphasized.

Author

N73-17053* Texas Univ., San Antonio, Medical School.
STABILITY OF HUMAN SERA COLLECTED FOR CLINICAL CHEMISTRY DETERMINATIONS
 Frank M. Townsend *In NASA*, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 23-25

CSCL 06P

Problems in collecting and shipping human sera for clinical chemical analyses affect their stability and require proper preservation methods. It is shown that glutamic pyruvate transaminase is very unstable and serum cannot be shipped unless the shipping time is carefully controlled and is less than two days under refrigeration. A limit of four days handling time and avoidance of light exposure are required in bilirubin testing of specimens. Addition of 11 mg of a 10 to 1 mixture of finely powdered sodium fluoride and thymol per ml of blood to preserve specimen stability en route to a central laboratory prevents glycolysis. A citrate buffer at pH 6.2 in serum to be tested for alkaline phosphatase lessens decline at room temperature. G.G.

N73-17054* Michigan Univ., Ann Arbor, Inst. for Social Research.

PSYCHOSOCIAL FACTORS IN CORONARY HEART DISEASE

John R. P. French, Jr. and Robert D. Chaplin *In NASA*, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 26-72 refs
 CSCL 06E

The relationship between job satisfaction and coronary heart disease is explored for blue and white collar groups, different personalities and physiological risk factors. Differences found among administrators, engineers and scientists with regard to variables associated with heart disease are in terms of physiology, personality, reported job stress, and smoking.

G.G.

N73-17055* National Aeronautics and Space Administration, Washington, D.C.

LEAVE TAKING AND OVERTIME BEHAVIOR AS RELATED TO DEMOGRAPHIC, HEALTH, AND JOB VARIABLES

Louis B. Arnoldi and John C. Townsend *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1969 p 73-94

CSCL 06P

An intra-installation model is formulated that correlates demographic, health and job related variables to the various types and amounts of leave and overtime taking behavior of employees. Statistical comparison of composite health ratings assigned to subjects based upon clinical criteria and bio-statistical data show that those employees who take the most annual leave as well as sick leave are the ones that have the poorest health ratings: employees who put in the most overtime have also the poorest health records. Stress effects of peak activity periods increase use of sick leave immediately after peak activity but not the use of annual leave.

G.G.

N73-17056* National Aeronautics and Space Administration, Washington, D.C.

ENVIRONMENTAL HEALTH PROGRAM IN NASA

Rudolph M. Marrazzo *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1969 p 95-106
 CSCL 06P

The NASA policy on environmental health uses medical and environmental concepts to: (1) Determine the health status of employees; (2) prevent illness and promote good health among employees; and (3) identify and control factors that affect the health of personnel and quality of environment. Evaluation and control of physical, chemical, radiological and biological factors surrounding personnel and which represent physiological and psychological stresses and impairment are considered.

G.G.

N73-17057* National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

ENVIRONMENTAL HEALTH PROGRAM ACTIVITIES

Charles P. Bergtholdt *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 107-110*
CSCL 06P

Activities reported include studies on toxic air contaminants, excessive noise, poor lighting, food sanitation, water pollution, and exposure to nonionizing radiation as health hazards. Formulations for a radiological health manual provide guidance to personnel in the procurement and safe handling of radiation producing equipment and Apollo mission planning. A literature search and development of a water analysis laboratory are outlined to obtain information regarding microbiological problems involving potable water, waste management, and personal hygiene. G.G.

N73-17058* National Academy of Sciences-National Research Council, Washington, D.C.

THE RELATIONSHIP OF NASA OCCUPATIONAL MEDICINE AND ENVIRONMENTAL HEALTH WITH THE ADVISORY CENTER ON TOXICOLOGY

Ralph C. Wands *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 111-116*

CSCL 06T

Preventive measures of occupational medicine and industrial hygiene are coordinated to identify toxicities of industrial products and safety standards in manned space flight applications. Emphasized is the off-gassing of construction materials in spacecraft with the resulting contamination of the cabin atmosphere and the establishment of criteria for the quality of drinking water for astronauts during Gemini and Apollo programs. G.G.

N73-17059* National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

MACHINING OF LOW PERCENTAGE BERYLLIUM COPPER ALLOYS

John G. Habermeyer *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 117-120*

CSCL 06T

Airborne beryllium sampling during machining of low percentage beryllium-copper alloys shows that normal dry machining creates 45.2 microgram/cu m of airborne beryllium in the casting operators breathing zone and 2.3 microgram/cu m in an adjacent machine working area. A small vacuum system placed over the tool effectively removes airborne beryllium in the breathing zone sample to 0.2 microgram/cu m. G.G.

N73-17060* National Aeronautics and Space Administration, Electronics Research Center, Cambridge, Mass.

PRELIMINARY REPORT ON USE OF LAHEY CLINIC AUTOMATED HISTORY IN AN INDUSTRIAL COMPLEX

B. O. Leonardson *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 121-123*

CSCL 05B

A questionnaire has been developed and used extensively as an aid to the appointment office in determining what department a patient should be referred to and what time for special consultations should be reserved. It has helped to maintain a balanced case load and informs the physician in advance about the patients he will see. By coordinating appointments so that the patient can visit two or more of the specialty departments in one day rather than having to return a number of times to see different doctors, it has increased efficiency. The questionnaire screens for important symptoms or trouble spots to which the computer is programmed to assign scoring values which in turn point out the clinic division or section to which the patient should initially be referred. Author

N73-17061* National Aeronautics and Space Administration, Wallops Station, Wallops Island, Va.

REVIEW OF A SERIES OF PROCTOSIGMOIDOSCOPIES DONE AT WALLOPS STATION, VIRGINIA

Edward White *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 124-126*
CSCL 06E

Routine proctosigmoidoscopic examinations for incidence of polyps in NASA installation asymptomatic personnel establish the value of this method in detecting cancer without invasion beyond the stalk and resulting in curative operation at greater survival rates than in later detections. G.G.

N73-17062* University of Southern Calif., Los Angeles.

SENSITIVITY TO EMOTIONAL ILL HEALTH

Jean Spencer Felton *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 127-158 refs*

CSCL 05J

The services of mental specialists, such as psychologists, psychiatrists, or psychiatric social workers are required to assure maximum human performance in Government facilities. Contemporary mental health programming covers emotionally generated problems at operational sites to complete disclaiming of the existence of such difficulties among workers. Frequent taking of sick leave or annual leave when work seems demanding or when a promotion does not materialize, chronic or repeated tardiness, requests for frequent transfers, work over-loading, accidental injuries, and alcoholism are all forms of stress responses and indicate a need for emotional counselling. G.G.

N73-17063* Massachusetts Inst. of Tech., Cambridge.

LABORATORY HOOD DESIGN

Richard I. Chamberlin *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 157-165*

CSCL 06Q

A supply air hood is described that provides a curtain of clean air just outside of the hood surface for protection of the operator. The design consists of an overhead plenum which extends out from the hood with tapered sides extending from the plenum to the bench, a slotted baffle plate and two perforated plates with offset holes, dust filters, and a special deflector plate. The latter introduces less than 4 cubic feet flow per minute through the special perforated area so that a sweeping effort is almost always maintained at bench level. Performance tests indicate that even under adverse exhaust conditions some of the supply air may be lost to the room, but none of the air within the hood that represents contaminated flow is entrained or displayed so that it enters the work area. This hood operates with an efficiency of about 90% exhaust for supplied air. G.G.

N73-17064# National Aeronautics and Space Administration, Washington, D.C.

PROCEEDINGS OF THE ANNUAL CONFERENCE OF NASA CLINIC DIRECTORS, ENVIRONMENTAL HEALTH OFFICIALS AND MEDICAL PROGRAM ADVISORS

1970 184 p refs Conf. held at Cambridge, Mass., 13-15 Oct. 1970
(NASA-TM-X-69073) Avail: NTIS HC \$11.25 CSCL 06E

Medical problems common to NASA and aviation industry facilities are discussed. The focus centers on preventive counseling, environmental control, and physical and mental health measures. For individual titles.

N73-17065* National Aeronautics and Space Administration, Washington, D.C.

DYNAMIC EKG STUDY

Robert L. Fleck *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 1-4*
CSCL 06E

The use of the dynamic EKG study as a part of periodic health examination is considered to be a valuable complement to other forms of stress testing with its ability to detect abnormal heart responses to stress stimuli. It is believed that statistical correlations of dynamic EKG findings with physical examination results contribute greatly to the understanding of cardiac abnormalities.

Author

N73-17066* National Aeronautics and Space Administration, Washington, D.C.

NORMALLY EXPECTED ABERRATIONS IN THE 8-HOUR DYNAMIC EKG

Robert L. Fleck, Louis B. Arnoldi, John C. Townsend, and Xenia Tonesk *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 5-17

CSCL 06E

The establishment of norms for interpreting long term dynamic electrocardiograms is attempted by correlating a completely disease-symptom- and cardiac risk factor-free sample with a non-pure sample in the direction of normality on various variables. Out of a population of 362 subjects exposed to dynamic electrocardiogram testing, a discrimination between normals and abnormals in terms of traditional risk factors was observed. The two groups differed significantly on the following variables: cholesterol, smoking, systolic blood pressure, white blood count, fasting blood sugar, uric acid, resting EKG, year of birth, and coronary insufficiency.

G.G.

N73-17067* National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

AN EXERCISE PRESCRIPTION INTERVENTION PROGRAM WITH PERIODIC ERGOMETRIC GRADING

Cannon A. Owen and Earl F. Beard *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 18-38 refs

CSCL 06E

A long term exercise prescription type of physical conditioning program has been available to executive personnel of the NASA Manned Spacecraft Center for the past two years. Periodic ergonomic testing with a heart rate controlled, automatically programmed, bicycle ergometer is used to follow the individual's progress and appropriately alter his exercise prescription from time to time. Such a program appears feasible, and acceptance is excellent, dropout rates small and periodic testing participation good. Subjects training diligently can maintain satisfactory levels of conditioning.

Author

N73-17068* National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

MEDICAL AUTOMATION SYSTEM AT THE MARSHALL SPACE FLIGHT CENTER

James H. Spraul *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 39-51

CSCL 06E

A computer system is reported for scheduling and coordinating physical examinations for groups of people who work with chemicals, lasers, X-rays, isotopic sources, toxic fuels, adhesives, and exotic metals. Complete medical data on the examined population are continuously updated for a broad medical master file. Statistical methods are employed to project progressive changes in the health status of these employees for possible clinical interventions.

G.G.

N73-17069* Public Health Service, Washington, D.C.

PERSONAL BENEFITS OF A HEALTH EVALUATION AND ENHANCEMENT PROGRAM

Fred Heinzelmann and Donald C. Durbeck *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 52-79 refs

CSCL 06E

A study was made of the benefits reported by participants in a health evaluation and enhancement program dealing with physical activity. Program benefits were identified and defined in regard to three major areas: program effects on work; program effects on health; and program effects on habits and behavior. A strong positive and consistent relationship was found between reported benefits in each of these areas and measures of improvement in cardiovascular functioning based on treadmill performance. Significant differences in these measures of improvement were also found between participants who reported program benefits and those persons who did not. These findings provide a meaningful profile of the pattern of benefits generated by this kind of health program.

Author

N73-17071* Army Environmental Hygiene Agency, Edgewood Arsenal, Md. Laser-Microwave Div.

HAZARDS FROM HIGH INTENSITY LAMPS AND ARCS

David H. Sliney *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 83-95 refs

CSCL 06R

The principal occupational health problem generally associated with high intensity arc lamps results from exposure of the eye and skin to ultraviolet radiation. Occasionally, the chorioretinal burns are of concern. The eye is generally more susceptible than the skin to injury from high intensity optical radiation sources whether ultraviolet, visible or infrared. Recent developments in technology have shown that some high intensity optical radiation sources which have output parameters greatly different from those encountered in the natural environment present a serious chorioretinal burn hazard.

Author

N73-17072* National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

THE VALUE OF CONTINUED FOLLOWUP IN A PREVENTIVE MEDICINE PROGRAM

Carlos Villafana and Jean Mockbee *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 96-119

CSCL 06E

Continued monitoring of hypertension and cholesterol levels in NASA employees by regularly scheduled medical examinations prevents an increase in employee disability and cardiovascular mortality rates. Adequate therapeutic control for younger hypertensive employees is demonstrated by records on mortality and heart diseases over a period of 28 months. It confirmed the importance of systolic blood pressure as diagnostic tool for the inherent risk factor. The prevalence of additional coronary risk factors among employees with hypercholesterolemia is considerably less than in employees with hypertension.

G.G.

N73-17073* San Antonio State Tuberculosis Hospital, Tex.

LABORATORY ASPECTS OF BLOOD LIPIDS

Frank M. Townsend *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 120-130 refs

CSCL 06E

Classification of blood hyperlipemias by electrophoresis or ultracentrifugation according to density fraction is described and therapeutic measures for humans with hyperlipoproteinemia are outlined. The statistically significant relationship between high serum cholesterol levels and incidence of coronary disease prescribes restricted caloric intake or physical exercise to burn excess calories as preventive measures.

G.G.

N73-17074* Harvard School of Public Health, Boston, Mass. Dept. of Physiology.

PROGRAMMED MULTIPHASIC HEALTH TESTING

Philip I. Hershberg *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 131-143 refs

N73-17076

(Grant NGR-22-007-203)
CSCL 08E

Multiphase health screening procedures are advocated for detection and prevention of disease at an early stage through risk factor analysis. The use of an automated medical history questionnaire together with scheduled physical examination data provides a scanning input for computer printout. This system makes it possible to process laboratory results from 1,000 to 2,000 patients for biochemical determinations on an economically feasible base.

G.G.

N73-17076* Trans World Airlines, Inc., Kansas City, Mo. Medical Service.

FLIGHT CREW HEALTH MAINTENANCE

Charles C. Gullett *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 172-177

CSCL 08E

The health maintenance program for commercial flight crew personnel includes diet, weight control, and exercise to prevent heart disease development and disability grounding. The very high correlation between hypertension and overweight in cardiovascular diseases significantly influences the prognosis for a coronary prone individual and results in a high rejection rate of active military pilots applying for civilian jobs. In addition to physical fitness the major items stressed in pilot selection are: emotional maturity, glucose tolerance, and family health history.

G.G.

N73-17077* Boeing Co., Seattle, Wash.

OCCUPATIONAL MEDICAL TRENDS IN THE 70'S FROM INDUSTRIAL VIEW

Sherman M. Williamson *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1970 p 178-180

CSCL 08E

Industrial health measures to ensure worker productivity constitute physical examinations as well as environmental control systems. Considered are automatic record keeping facilities for case histories, preventive medical and mental counselling, development of safety standards, and health insurance and disability benefit plans. Cooperation of industry health programs with community health aspects is required to eliminate the loss of manpower capability through alcoholism or mental disease.

G.G.

N73-17078*# National Aeronautics and Space Administration, Washington, D.C.

PROCEEDINGS OF THE ANNUAL CONFERENCE OF NASA CLINIC DIRECTORS, ENVIRONMENTAL HEALTH OFFICIALS AND MEDICAL PROGRAM ADVISORS

1971 274 p refs Conf. held at Charleston, S. C. 12-14 Oct. 1971

(NASA-TM-X-69074) Avail: NTIS HC \$15.75 CSCL 08E

Data covering techniques and types of services provided to NASA employees in occupational medicine and environmental health are outlined. Specific summaries are given for coronary disease, chronic disease, and occupation induced disorders. Numerous other topics, procedures, and medical equipment are also discussed.

N73-17079* National Aeronautics and Space Administration, Washington, D.C.

THE MANAGEMENT OF NASA EMPLOYEE HEALTH PROBLEM: STATUS 1971

Louis B. Arnoldi *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 1-18

CSCL 08E

A system for assessing employee health problems is introduced. The automated billing system is based on an input

format including cost of medical services by user and measures in dollars, that portion of resources spent on preventive techniques versus therapeutic techniques. The system is capable of printing long term medical histories of any employee.

E.H.W.

N73-17080* National Aeronautics and Space Administration, Washington, D.C.

CORONARY RISK FACTOR SCORING AS A GUIDE FOR COUNSELING

Robert L. Fleck *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 17-28

CSCL 08E

A risk factor scoring system for early detection, possible prediction, and counseling to coronary heart disease patients is discussed. Scoring data include dynamic EKG, cholesterol levels, triglycerine content, total lipid level, total phospholipid levels, and electrophoretic patterns. Results indicate such a system is effective in identifying high risk subjects, but that the ability to predict exceeds the ability to prevent heart disease or its complications.

E.H.W.

N73-17081* Catholic Univ. of America, Washington, D.C.

THE MOTIVATING INFLUENCE OF RETEST AND REPEATED DIETARY COUNSELING ON CHOLESTEROL REDUCTION

Paul Taylor, John C. Townsend, Carlos Villafana, and Louis B. Arnoldi *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 29-49 refs

CSCL 08E

An analysis was made of retest and followup counselling effects on the reduction of hypercholesterolemia levels in NASA employees. Criteria used to measure such control include motivation, age of patient, personality of patient, job stress, and physical exercise.

E.H.W.

N73-17082* Pan American World Airways, Inc., Cocoa Beach, Fla.

STRESS STUDIES AT KENNEDY SPACE CENTER: A BACKWARD AND FORWARD LOOK

A. I. Decker *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 50-72

CSCL 08S

Possible relationships between occupational and other stresses on ischemic heart disease are explored. Three procedures were used: (1) double master 2-step test, (2) dynamic ECG technique using avionics equipment, and (3) submaximal stress testing with Marco bicycle ergometer.

E.H.W.

N73-17083* Harvard Univ., Boston, Mass.

LONG TERM CLINICAL RELATIONSHIPS OF THE VENTRICULAR PREMATURE BEAT

Philip I. Hershberg, D. Desai (Lahey Clinic Foundation), and Sidney S. Alexander (Lahey Clinic Foundation) *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 73-85 refs

CSCL 08E

A study of the relationship between ventricular premature beats, mortality, and acute myocardial infarction in a clinic population is reported. Statistical results are presented in tables.

Author

N73-17084* Kettering Memorial Hospital, Dayton, Ohio.

THE CORONARY PATIENT IN INDUSTRY

Benjamin Schuster *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 86-99

CSCL 08E

The coronary patient, as he pertains to industry particularly NASA, is discussed. Concepts of precoronary care, acute attacks

which may develop while on the job, and the return of the cardiac patient to work are covered. Major emphasis was on the prevention of sudden death due to coronary disease. Author

N73-17085* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

INFRASOUND

F. G. Pierce *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 100-107 refs

CSCL 06S

Infrasound, sound frequencies from 2 to 20 cpc, is defined and its effects on the human body are analyzed. Subjective symptoms of infrasound include fatigue, irritability, insomnia, headache, lack of ability to concentrate, and loss of equilibrium. No conclusive results were reported. E.H.W.

N73-17086* SysteMed Corp., Dayton, Ohio.

THE MANAGEMENT OF CHRONIC DISEASE: A STUDY OF EMPLOYEE MORBIDITY AND MORTALITY AT THE NASA, GODDARD SPACE FLIGHT CENTER, 1966 - 1971

Carlos Villafana and Jean Mockbee *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 108-134

CSCL 06E

Several approaches to studying chronic disease patterns in the employee population at Goddard Space Flight Center from 1966 to 1970 are presented. Attempts were made to summarize preliminary data for 1971 and relate this data to specific programs and events which may have had some causative influence. Investigative data for the study cover records of periodic and return to work examinations, injury and illness visit reports, mortality data, and health trends with and without external influences. E.H.W.

N73-17087* Brunswick Naval Air Station, Me.

AUTOMATION OF THE PROBLEM ORIENTED MEDICAL RECORD

D. W. Schall *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 135-144

CSCL 05B

An improved ambulatory care delivery system developed for the Navy is examined. The system is centered around the concepts of problem oriented medical records and expanded use of paramedical personnel. E.H.W.

N73-17088* National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.

A CASE OF NEAR FATAL AMMONIA GAS POISONING

Edward White *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 145-150

CSCL 06T

A report is given of the near fatal effects of anhydrous ammonia poisoning to a repairman working on a compression room cooling system. The repairman was exposed for approximately 5 minutes to an environment of nearly 100% ammonia gas. Descriptions are given of body burns, breathing problems, and eye burns suffered by the worker. E.H.W.

N73-17089* San Antonio State Tuberculosis Hospital, Tex.

SOME PITFALLS OF URINE ANALYSIS

Frank M. Townsend *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 151-161 refs

CSCL 06E

Possible failures or erroneous findings during routine urine analysis are surveyed. Data cover tablet, tape, and stick type analysis techniques. E.H.W.

N73-17090* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

BACTERIAL IDENTIFICATION USING LIGHT SCATTERING MEASUREMENTS: A PRELIMINARY REPORT

Judd R. Wilkins *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 162-172 refs

CSCL 06M

The light scattering properties of single bacterial cells were examined as a possible means of identification. Three species were studied with *streptococcus faecalis* exhibiting a unique pattern; the light-scattering traces for *staphylococcus aureus* and *escherichia coli* were quite similar although differences existed. Based on preliminary investigations, the light scattering approach appeared promising with additional research needed to include a wide variety of bacterial species, computer capability to handle and analyze data, and expansion of light scattering theory to include bacterial cells.

Author

N73-17091* Public Health Service, Rockville, Md.

THE NASA-USPHS HEALTH EVALUATION AND ENHANCEMENT PROGRAM

D. C. Durbeck, F. Heinzelmann, R. T. Moyle, III, J. Schacter, G. H. Payne, D. D. Limoncelli, S. M. Fox, III, and Louis B. Arnoldi *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1972 p 173-195 refs

CSCL 06E

An exercise program was initiated to assess the feasibility of an on the job health evaluation and enhancement program, as well as to identify the factors which influenced volunteering, adherence, and effectiveness of the program. The program was utilized by 237 of the 998 eligible Federal employees, with a mean attendance of 1.3 days per week. Those who volunteered perceived a need for increased physical activity, felt they had sufficient time to participate, and derived subjective as well as objective benefits. Significant improvements were found in heart rate response to the standard exercise test, body weight, skinfold measurements, and triglycerides. A consistent relationship was found between subjectively reported effects of the program on work, health habits, and behavior, and improvement in cardiovascular function, based on treadmill performance. Numerous personal and programmatic factors influencing volunteering and participation were identified.

Author

N73-17092* National Health Service, Inc., New York.

IMPACT OF NASA STRESS LABORATORY PROGRAM ON US COLLEGES

S. P. DeLisser *In NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 196-203

CSCL 06S

A programmatic narrative of the effects of NASA stress lab program on physical education in U.S. schools and colleges is presented. Individual non-structured programs were set up where students participate during his or her free time. The program is also in accordance with the medical history of the student. Preliminary results indicate more student interest and participation in the program and that students are generally more physically fit than in previous structured programs.

E.H.W.

N73-17093* National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.

AN OPERATING ENVIRONMENTAL HEALTH PROGRAM

Jose G. Lipana, Richard L. Masters (Lovelace Found. for Med. Educ. and Res.), and William R. Winter *In its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors* 1971 p 204-223

CSCL 06E

Some concepts of an operational program for medical and environmental health are outlined. Medical services of this program

N73-17094

are primarily concerned with emergency care, laboratory examinations, advice to private physicians with patient permission, medical monitoring activities, and suggestions for treatment or control of the malfunction.

E.H.W.

N73-17094* Army Environmental Hygiene Agency, Edgewood Arsenal, Md.

NEW STANDARDS FOR ULTRAVIOLET RADIATION

David H. Sliney *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 224-240 refs

CSCL 06R

Guidelines covering safe levels for exposure to ultraviolet radiation in an occupational environment are reported. The guidelines clarify the spectral radiant exposure doses and relative spectral effectiveness of ultraviolet radiation required to elicit adverse biologic effects.

E.H.W.

N73-17097* National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

LEAD PENCILS

Leven B. Gray *In* its Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 260-264

CSCL 06T

A study, undertaken to determine the lead content of paint on various pencils in the Goddard supply system, is reported. The survey found that lead content varied from .04 mg per pencil for carmine colored pencils to approximately 43 mg per pencil for yellow colored pencils. Results also show that yellow pencils had higher lead content than other colors analyzed. More detailed results are given in tabular form.

E.H.W.

N73-17098# Advisory Group for Aerospace Research and Development, Paris (France).

AEROMEDICAL ASPECTS OF VIBRATION AND NOISE

J. C. Guignard and P. F. King Nov. 1972 280 p refs
(AGARDograph-151; AGARD-AG-151) Avail: NTIS HC \$16.00

Effects of aerospace vibration and noise on man are considered. The special aeromedical problems of auditory perception and noise injuries in aircrew and ground support personnel are emphasized.

N73-17099 Wright State Univ., Dayton, Ohio. Dept. of Engineering.

VIBRATION

J. C. Guignard *In* AGARD Aeromed. Aspects of Vibration and Noise Nov. 1972 p 1-113 refs

The nature of structure-borne vibration and its occurrence in aerospace operations are considered by mechanical and biological actions upon man, and by the criteria and principles of protecting man from its adverse effects.

Author

N73-17100 Wright State Univ., Dayton, Ohio.

NOISE

J. C. Guignard *In* AGARD Aeromed. Aspects of Vibration and Noise Nov. 1972 p 114-203 refs

Nature, measurement and occurrence of airborne noise in aerospace operations are considered by the biological effects on man. General criteria and principles of the protection of man from the adverse effects of noise on human well being and working efficiency are outlined.

Author

N73-17101 Royal Air Force Central Medical Establishment, London (England).

HEARING CONSERVATION IN AIRCREW AND GROUND SUPPORT PERSONNEL

P. F. King *In* AGARD Aeromed. Aspects of Vibration and Noise Nov. 1972 p 204-257 refs

The effects of noise on human hearing, both temporary and permanently, are reviewed and related to the working situations of members of aircrews and ground support personnel. Measures to be taken to prevent noise damage in the peripheral parts of the human hearing mechanism and to conserve hearing in personnel exposed to hazardous noise levels are outlined.

Author

N73-17102# American Inst. for Research, Washington, D.C. **DEVELOPMENT OF A STANDARDIZED BATTERY OF PERFORMANCE TESTS FOR THE ASSESSMENT OF NOISE STRESS EFFECTS**

George C. Theologus, George R. Wheaton, Angelo Mirabella, and Rae E. Brahlk NASA Jan. 1973 125 p refs
(Contract NAS1-9854)

(NASA-CR-2149) Avail: NTIS HC \$3.00 CSCL 06S

A set of 36 relatively independent categories of human performance were identified. These categories encompass human performance in the cognitive, perceptual, and psychomotor areas, and include diagnostic measures and sensitive performance metrics. Then a prototype standardized test battery was constructed, and research was conducted to obtain information on the sensitivity of the tests to stress, the sensitivity of selected categories of performance degradation, the time course of stress effects on each of the selected tests, and the learning curves associated with each test. A research project utilizing a three factor partially repeated analysis of covariance design was conducted in which 60 male subjects were exposed to variations in noise level and quality during performance testing. Effects of randomly intermittent noise on performance of the reaction time tests were observed, but most of the other performance tests showed consistent stability. The results of 14 analyses of covariance of the data taken from the performance of the 60 subjects on the prototype standardized test battery provided information which will enable the final development and test of a standardized test battery and the associated development of differential sensitivity metrics and diagnostic classificatory system.

Author

N73-17103# Stanford Research Inst., Menlo Park, Calif. **THE PROBABILISTIC STRUCTURE OF PLANETARY CONTAMINATION MODELS**

J. Michael Harrison and Warner D. North 30 Jan. 1973 33 p refs Presented at Seminar, NASA Spacecraft Sterilization Technol. Seminar, New Orleans

(Contract NASW-2451; SRI Proj. 2274)

(NASA-CR-130558; Proj-Memo-1) Avail: NTIS HC \$3.75 CSCL 06M

The analytical basis for planetary quarantine standards and procedures is presented. The hierarchy of planetary quarantine decisions is explained and emphasis is placed on the determination of mission specifications to include sterilization. The influence of the Sagan-Coleman probabilistic model of planetary contamination on current standards and procedures is analyzed. A classical problem in probability theory which provides a close conceptual parallel to the type of dependence present in the contamination problem is presented.

Author

N73-17104# Joint Publications Research Service, Arlington, Va.

EMOTIONAL STRESS DURING SPACEFLIGHT

L. Khachaturants and L. Grimal 23 Jan. 1973 9 p Transl. into ENGLISH from Aviats. i Kosmonavt. (Moscow), no. 11, 1972 p 33-34

(JPRS-58039) Avail: NTIS HC \$3.00

An examination of the emotional stress of cosmonauts during spaceflight is reported. Specific examples are cited including crews of the Voskhod-2 and Soyuz-4 and Soyuz-5 space ships.

Author

N73-17105# National Aeronautics and Space Administration, Washington, D.C.

PROBLEM OF ACCELERATION IN AVIATION MEDICINE. PART 3: FUNCTIONAL CHANGES IN THE NERVOUS SYSTEM DURING G-LOADS AND WEIGHTLESSNESS

G. L. Komendantov Feb. 1973 59 p refs Transl. into ENGLISH of the publ. "Problema Uskorenii v Aviatsionnoy Meditsine. Chast 3: Izmeneniya Funktsiy Nervnoy sistemy pri Peregruzkakh i Nevesomosti" Moscow, USSR Min. of Health, 1971 p 3-44 (NASA-TT-F-733) Avail: NTIS HC \$3.00 CSCL 06S

G-loads and weightlessness subject the human body to unusual stress during flights in aircraft and space vehicles. Equilibrium is difficult to maintain, and normal conditioned reflex activity is distorted by G-loads directed from the head to the pelvis and from the chest to the back. Numerous statistical data from a broad spectrum of Soviet sources constitute a survey of these specific problems.

Author

N73-17106# Advisory Group for Aerospace Research and Development, Paris (France).

SPECIAL ASPECTS OF AVIATION OCCUPATIONAL MEDICINE. CARDIOVASCULAR AND NERVOUS SYSTEM EFFECTS OF BROMOTRIFLUOROMETHANE

K. C. Back (AMRL) and E. W. VanStee (AMRL) Nov. 1972 20 p refs

(AGARD-R-599) Avail: NTIS HC \$3.00

The effects of three fluorocarbons of the haloalkane group, principally with bromotrifluoromethane, which have applications as effective fire extinguishing agents are studied. Animal experiments, performed to explore the mechanisms of the pharmacodynamic properties and to assess the toxic hazards associated with their use, are described. All three compounds have biological side effects and the report provides preliminary information, derived from animal experiments, on acceptable working concentrations for human exposure.

Author

N73-17107# Aerojet Medical and Biological Systems, El Monte, Calif.

MICROBIAL ECOLOGY MEASUREMENT SYSTEM Final Report, Oct. 1970 - Jul. 1972

Jul. 1972 128 p

(Contract NAS-11371)

(NASA-CR-128731) Avail: NTIS HC \$8.50 CSCL 06M

The sensitivity and potential rapidity of the PIA test that was demonstrated during the feasibility study warranted continuing the effort to examine the possibility of adapting this test to an automated procedure that could be used during manned missions. The effort during this program has optimized the test conditions for two important respiratory pathogens, influenza virus and Mycoplasma pneumoniae, developed a laboratory model automated detection system, and investigated a group antigen concept for virus detection. Preliminary tests on the handling of oropharyngeal clinical samples for PIA testing were performed using the adenovirus system. The results obtained indicated that the PIA signal is reduced in positive samples and is increased in negative samples. Treatment with cysteine appeared to reduce nonspecific agglutination in negative samples but did not maintain the signal in positive samples.

Author

N73-17108# Research Inst. of National Defence, Stockholm (Sweden).

CORRELATION BETWEEN MAN AND MOUSE IN RESPECT OF PHYSICAL ACTIVITY AND OXYGEN CONSUMPTION

FOA Reports, Volume 6, No. 11

Carl-Olov Criborn Oct. 1972 7 p refs

(FOA-1-B-1233-A5; ISBN-91-7056-018-8) Avail: NTIS HC \$3.00

In an attempt to discover the extent to which the results of experiments with mice are comparable to corresponding results found in studies of man, a study was made of correlations between mouse and man primarily in respect of physical activity and oxygen consumption. Treadwheels or treadmills are used to define and measure activity in the form of running speed, running time, distance run, etc. The basal metabolism, measured in oxygen consumption per unit of body weight, differs greatly between man and mouse, whereas the relative change in oxygen consumption on a change in activity is roughly the same. The difference in basal metabolism, however, may affect the sensitivity to variations in room temperature differently in man and in mouse, and may give rise to discrepancies in respect of the duration of symptoms.

Author

N73-17109# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. **MICROBIOLOGICAL SAMPLING OF SPACECRAFT CABLING, ANTENNAS, SOLAR PANELS AND THERMAL BLANKETS**

R. C. Koukol 15 Feb. 1973 20 p

(Contract NAS-100)

(NASA-CR-130383; JPL-900-602) Avail: NTIS HC \$3.00 CSCL 06M

Sampling procedures and techniques described resulted from various flight project microbiological monitoring programs of unmanned planetary spacecraft. Concurrent with development of these procedures, compatibility evaluations were effected with the cognizant spacecraft subsystem engineers to assure that degradation factors would not be induced during the monitoring program. Of significance were those areas of the spacecraft configuration for which special handling precautions and/or nonstandard sample gathering techniques were evolved. These spacecraft component areas were: cabling, high gain antenna, solar panels, and thermal blankets. The compilation of these techniques provides a historical reference for both the qualification and quantification of sampling parameters as applied to the Mariner Spacecraft of the late 1960's and early 1970's. Author

N73-17110# Kanner (Leo) Associates, Redwood City, Calif. **PHYSIOLOGICAL PROBLEMS OF PROLONGED WEIGHTLESSNESS**

N. N. Gurovskiy and A. A. Kiselev Washington NASA Feb. 1973 16 p Transl. into ENGLISH from Astronaut. Acta (Austria), v. 17, 1972 p 79-88 (Russian language report)

(Contract NASW-2481)

(NASA-TT-F-14672) Avail: NTIS HC \$3.00 CSCL 06S

Two dogs were exposed to weightlessness for about 22 days aboard the Soviet Cosmos 110 artificial satellite. Changes in cardiology characterized as the functional hyperdynamia cordis syndrome were revealed. The functions of the digestive, motor, coagulative and other systems of the animals' organisms were investigated. Among the significant changes discovered were: a 30 percent loss in body weight; disturbances of ion equilibrium and related water loss; disturbed enzyme forming function of the large intestine resulting in a sharp increase in the content of the intestinal enzymes enterokinase and alkaline phosphatase; 10-11 percent reduction in the mineral concentration in bone tissue; and decrease in lysozyme activity. The data indicate that space missions of relatively long duration (over 20 days) produce qualitatively new and more pronounced changes in the animal organism as compared to earlier flights of shorter duration.

Author

N73-17111# North Dakota State Univ., Fargo. Dept. of Polymers and Coatings.

QUANTITATION OF BURIED CONTAMINATION BY USE OF SOLVENTS Semiannual Report, 1 Jul. - 31 Dec. 1972

S. Peter Pappas, Paul Hsiao, and Loren W. Hill 31 Dec. 1972

13 p refs

(Grant NGR-35-001-012)

(NASA-CR-130720) Avail: NTIS HC \$3.00 CSCL 06M

An investigation was made to determine (1) sporidical properties of amine solvents that solubilize silicon resins, (2) recovery properties of a silicon potting compound (RTV 41) used in spacecraft, and (3) viability of spores during chemical curing of the potting compound. Results show that: (1) spores do remain viable during RTV 41 silicon potting chemical curing, and (2) spore recovery from cured silicon potting compound RTV 41 is very high when silicon rubber is dissolved in butylamine and series dilution with benzene prior to plate curing.

E.H.W.

N73-17112# Ohio State Univ. Research Foundation, Columbus. Dept. of Anatomy.

EFFECTS OF WEIGHTLESSNESS ON THE DEVELOPMENT OF THE VESTIBULAR APPARATUS AND OCULAR NYSTAGMUS IN THE RAT Annual Report, 1 Oct. 1971 - 30 Sep. 1972

David L Clark 18 Dec. 1972 54 p refs

(Contract NAS2-6634; RF Proj. 3329-A1)
(NASA-CR-114569: Rept-4) Avail: NTIS HC \$4.75 CSCL 06C

The chronic 2g centrifuge was constructed for testing weightlessness effects on development of vestibular apparatus and ocular nystagmus in the rat. Both the stationary and rotating rail tests were performed. A physiological review is presented on vestibular apparatus, along with a system analysis. Time constants and input threshold level of the system are also considered.

J.A.M.

**N73-17113*# St. Louis Univ., Mo. Dept. of Physiology.
OBJECTIVE EVALUATION OF CUTANEOUS THERMAL
SENSIVITY**

W. VanBeumont Oct. 1972 62 p refs

(Grant NGR-26-006-039)

(NASA-CR-114564) Avail: NTIS HC \$5.25 CSCL 06P

The possibility of obtaining reliable and objective quantitative responses was investigated under conditions where only temperature changes in localized cutaneous areas evoked measurable changes in remote sudomotor activity. Both male and female subjects were studied to evaluate sex difference in thermal sensitivity. The results discussed include: sweat rate responses to contralateral cooling, comparison of sweat rate responses between men and women to contralateral cooling, influence of the menstrual cycle on the sweat rate responses to contralateral cooling, comparison of threshold of sweating responses between men and women, and correlation of latency to threshold for whole body sweating. It is concluded that the quantitative aspects of the reflex response is affected by both the density and activation of receptors as well as the rate of heat loss; men responded 8-10% more frequently than women to thermode cooling, the magnitude of responses being greater for men; and women responded 7-9% more frequently to thermode cooling on day 1 of menstruation, as compared to day 15.

F.O.S.

**N73-17114*# Battelle-Northwest, Richland, Wash.
MEASUREMENT OF RADIATION EXPOSURE OF ASTRONAUTS BY RADIOCHEMICAL TECHNIQUES Quarterly
Research Report, 3 Jan. - 2 Apr. 1972**
R. L. Brodzinski 15 Apr. 1972 29 p refs Sponsored by
NASA and AEC
(NASA-CR-130538; BNWL-1183-11) Avail: NTIS HC \$3.50
CSCL 06S

Only two of the fecal specimens collected inflight during the Apollo 15 mission were returned for analysis. Difficulty in obtaining reasonably accurate radiation dose estimates based on the cosmogenic radionuclide content of the specimens was encountered due to the limited sampling. The concentrations of Na-22, K-40, Cr-51, Fe-59, and Cs-137 are reported. The concentrations of 24 major, minor, and trace elements in these two specimens were determined. Most concentrations are typical of those observed previously. Major exceptions are extremely low values for selenium and extraordinarily high values for rare earth elements. The net Po-210 activities in the Apollo 11 and 12 Solar Wind Composition foils and in the Apollo 8 and 12 spacecraft reflective coatings due to lunar exposure have been determined. Equilibrium concentrations of 0.082 + or - 0.012 disintegrations /sq cm sec of Rn-222 in the lunar atmosphere and 0.0238 + or - 0.0035 disintegrations /sq cm sec of Po-210 on the lunar surface have been calculated for Oceanus Procellarum.

Author

**N73-17115# Texas Technological Univ., Lubbock. Center of
Biotechnology and Human Performance.
INDIVIDUAL DIFFERENCES AS A FUNCTION OF FOUR
CHOICE INFORMATIONAL LOAD AND S-R COMPATIBILITY**

Lewis E. Waldeisen, Jerry M. Owens, and Charles G. Halcomb
Oct. 1972 21 p refs
(Contract DAAD05-69-C-0102; DA Proj. 1TO-14501-B-81A; Proj. Themis-603)

(AD-752073) Avail: NTIS CSCL 05/10

A four choice reaction-time task using color and symbol dimensions was varied in terms of type of stimulus presentation

and S-R compatibility. Six groups of 20 Ss each performed six different task versions. Responding with hands only in four groups proved significantly easier than hand-foot responding in two other groups. The group receiving a singular dimension of colors performed significantly better than a group receiving only symbols. Both of these groups demonstrated greater efficiency than two groups required to filter noise or irrelevant dimensions. Distributions of scores increased considerably about group means with increasing informational load and decreasing S-R compatibility. The utility of the choice reaction task for discriminating individual skill potentials in various information-handling situations was affirmed.

Author (GRA)

N73-17116# Human Engineering Labs., Aberdeen Proving Ground, Md.

PUPILLOMETRY USING AN ADVANCED-DESIGN OCULOMETER

Robert J. Hall Nov. 1972 18 p refs Presented at the 80th Ann. Conv. of the Am. Psychological Assoc., Honolulu, Hawaii, 2-8 Sep. 1972

(AD-752121; HEL-TM-25-72) Avail: NTIS CSCL 05/10

A number of available eye monitoring techniques are briefly contrasted to show the advantages and limitations of each. In addition a recently developed oculometer is described which is unique in that it provides: (1) a technique for tracking and observing the eye which does not interfere with the subject's normal viewing behavior, (2) data reduction capacity for handling large volumes of data on an on-line basis enabling immediate feedback to the subject and (3) measurement of a wide spectra of visual responses which include basic measures such as voluntary eye movement, blinking, changes in pupil size and derived measures such as variability of fixation times and scan patterns.

Author (GRA)

N73-17117*# Martin Marietta Corp., Denver, Colo.

CONCEPTUAL DESIGN STUDY FOR A TELEOPERATOR VISUAL SYSTEM, PHASE 1 Final Report

D. Adams, C. Grant, C. Johnson, R. Meirick, C. Polhemus, A. Ray, D. Rittenhouse, and R. Skidmore Dec. 1972 175 p refs
(Contract NAS8-29024)

(NASA-CR-124059; MCR-72-276) Avail: NTIS HC \$10.75
CSCL 05H

Results are reported for work performed during the first phase of the conceptual design study for a teleoperator visual system. This phase consists of four tasks: General requirements, concept development, subsystem requirements and analysis, and concept evaluation.

Author

N73-17118*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

PILOT PERFORMANCE DURING A SIMULATED STANDARD INSTRUMENT PROCEDURE TURN WITH AND WITHOUT A PREDICTOR DISPLAY

John G. Kreifeldt and Thomas Wempe Jan. 1973 34 p refs Prepared in cooperation with Tufts Univ., Medford, Mass.
(NASA-TM-X-82201) Avail: NTIS HC \$3.75 CSCL 05E

A simulator study was conducted to measure the effectiveness of predictor information incorporated into a CRT display of a computer simulated aircraft's horizontal and vertical situation. Professional pilots served as subjects for the task of executing a standard instrument procedure turn at constant altitude in constant crosswinds with and without their predicted ground track displayed. The results showed that the display with the predicted ground track was markedly and significantly superior to the display without this information and that the subjects were generally satisfied with this type of information. Mean rms lateral path error was independent of the crosswind velocity with the predictor information, and increased without it and with increasing wind velocity. Rms stick activity decreased with the predictor display which also uncoupled aileron and elevator activity.

Author

N73-17119# Civil Aeromedical Inst., Oklahoma City, Okla.

GP88/360 COMPUTER MODELS TO SIMULATE AIRCRAFT PASSENGER EMERGENCY EVACUATION

Earl D. Folk, J. D. Garner, E. Allen Cook, and Jimmy L. Broadhurst
(IBM, Oklahoma City) Sep. 1972 30 p refs
(FAA-AM-72-30) Avail: NTIS HC \$3.50

Live tests of emergency evacuation of transport aircraft are simulated by computer models based on statistics from measured components of the escape path. The models utilize a computer programming language to represent various features of the escape process: passenger mix, seating and exit configuration, door-opening delay, time on the escape slide, and slide capacity. Two particular configurations of aircraft have been simulated: the Boeing 720 124-Passenger Model and a 234-Passenger Model. On the former the total time for all passengers to get out averaged 89.23 seconds, with a standard deviation of 6.38 seconds for 20 randomized runs. On the latter the corresponding average and standard deviations were 74.09 and 2.29 seconds, respectively. Both models indicated under-utilization of the aft exit.

Author

N73-17120*# Acurex Corp., Mountain View, Calif.
HIGH PRESSURE SPACE SUIT GLOVE Final Report

William Elkins Jan. 1973 30 p
(Contract NAS2-7008)

(NASA-CR-114635) Avail: NTIS HC \$3.50 CSCL 06Q

The High Pressure Space Suit Glove Program yielded one prototype glove assembly, with an operating pressure of 8.0 psi. The following developments are reported: (1) A new layup technique for incorporation of the mini-convolute systems; (2) modification in the mini-convolute construction to assure cycle life at 8.0 psi in excess of 100,000 cycles; (3) the development of a unique non-orthogonal low torque wrist joint; (4) the development of a low torque single axis joint for use in the thumb and finger first metacarpal joints; and (5) a number of approaches to 1st metacarpal joints were fabricated and tested to establish the joint techniques.

Author

N73-17121# Joint Publications Research Service, Arlington, Va.

PROBLEMS OF MAN'S INTERACTION WITH HIS NATURAL ENVIRONMENT

Ye. K. Fedorov and I. B. Novik 31 Jan. 1973 18 p refs
Transl. into ENGLISH from Vopr. Filosofii (Moscow), no. 12 p 48-58

(JPRS-58113) Avail: NTIS HC \$3.00

A survey of published discussions concerning problems of environmental pollution and depletion of natural resources is reported. It is concluded that in the process of optimization of interaction with nature there are fundamental advantages in a social system based on collective ownership.

Author

N73-17122*# National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

AN INVESTIGATION OF A STERILE ACCESS TECHNIQUE FOR THE REPAIR AND ADJUSTMENT OF STERILE SPACECRAFT

Franklin H. Farmer, Harry V. Fuller, and Richard M. Hueschen Washington Feb. 1973 57 p refs

(NASA-TN-D-7147; L-8538) Avail: NTIS HC \$3.00 CSCL 06M

A description is presented of a unique system for the sterilization and sterile repair of spacecraft and the results of a test program designed to assess the biological integrity and engineering reliability of the system. This trailer-mounted system, designated the model assembly sterilizer for testing (MAST), is capable of the dry-heat sterilization of spacecraft and/or components less than 2.3 meters in diameter at temperatures up to 433 K and the steam sterilization of components less than 0.724 meter in diameter. Sterile access to spacecraft is provided by two tunnel suits, called the bioisolator suit systems (BISS), which are contiguous with the walls of the sterilization chambers. The test program was designed primarily to verify the biological and engineering reliability of the MAST system by processing simulated space hardware. Each test cycle simulated the initial sterilization of a spacecraft, sterile repair of a failed component, removal of the spacecraft from the MAST for mating with the bus, and a sterile recycle repair.

Author

N73-17123*# BioTechnology, Inc., Falls Church, Va.
HABITABILITY ISSUES IN LONG DURATION UNDERSEA AND SPACE MISSIONS Final Report
James F. Parker, Jr. and Martin G. Every Jul. 1972 57 p refs
Sponsored in part by NASA
(Contract N00014-71-C-0387; NR Proj. 196-113)
(NASA-CR-130537; AD-747890) Avail: NTIS HC \$5.00 CSCL 05/5

The report reviews a number of studies in the area of habitability. Emphasis was placed on extracting from these studies that information most relevant to any long-term mission in confinement. It is concluded that, whereas the basic laws of habitability are known, there is much yet to be learned concerning development of social structures in small groups in relative isolation, planning for necessary hygiene needs, development of proper work spaces, and construction of internal and external communications systems. With respect to testing for habitability and the documentation of habitability principles, the space program was found to be considerably more advanced than was the program for undersea missions.

Author (GRA)

N73-17124# Naval Aerospace Medical Research Lab., Pensacola, Fla.

EMPIRICAL REDUCTION IN POTENTIAL USER POPULATION AS THE RESULT OF IMPOSED MULTIVARIATE ANTHROPOMETRIC LIMITS Medical Research Progress Report

William F. Moroney and Margaret J. Smith 21 Sep. 1972 17 p refs

(AD-752032; NAMRL-1164; PR-1) Avail: NTIS CSCL 05/5

Data describing thirteen, cockpit related, anthropometric features of 1547 naval aviator personnel were examined. Two analyses were performed on these data. In the first analysis individuals not included within the 5th percentile to 95th percentile critical limits on any of the 13 features cited above were eliminated. After all 13 eliminations had been completed, 814 (52.6%) of the original 1547 naval aviator personnel had been excluded. In the second analysis, the critical limits were established at the 3rd and 98th percentiles, and 499 (32.2%) of the personnel were excluded. Thus, where one might have expected only 10 per cent of the population to have been excluded, 52.6 per cent were excluded, and where only 5 per cent theoretically might have been excluded, 32.2 per cent were excluded. This seeming discrepancy may be attributed to the intercorrelations existing between the 13 variables. The importance of considering the relationship between anthropometric features in determining anthropometric compatibility is discussed. The preparation of bivariate data, which are not variable specific but which could be used when the correlation between anthropometric features is known, is proposed.

Author (GRA)

N73-17125# Naval Postgraduate School, Monterey, Calif.
THE USE OF A LINEAR RATING SCALE IN SELECTING A SUBCRITICAL TRACKING TASK PARAMETER

Ronald A. Hess Sep. 1972 29 p refs
(AD-752036; NPS-57HE72091A) Avail: NTIS CSCL 05/10

The results of a brief experimental study are presented in which subjective operator opinion, expressed on a linear, nonadjective rating scale, was used in selecting a subcritical tracking task parameter.

Author (GRA)

N73-17126# Environmental Health Lab., McClellan AFB, Calif.
THE INDUSTRIAL HYGIENE SURVEY Final Report

Ronald D. Burnett May 1972 42 p
(EHL Proj. OBC-209)

(AD-751897; EHL-M-72M-11) Avail: NTIS CSCL 06/9

The paper describes the complexities involved in conducting a meaningful industrial hygiene survey and is illustrated with numerous photographs of environmental evaluations being accomplished at a variety of typical Air Force industrial operations. The paper was presented at the USAF Occupational Safety and Health Act Conference held at the Air Force Inspection and Safety Center, Norton AFB, California on 18-20 Apr. 72 to familiarize safety personnel with the field of industrial hygiene.

Author (GRA)

N73-17127# American Cyanamid Co., Bound Brook, N.J. Organic Chemicals Div.

PLASTIC MATERIALS FOR EYE PROTECTION FROM LASERS Technical Report, 3 May 1971 - 15 Jul. 1972

Allan E. Sherr, William F. Cordes, III, and Robert J. Tucker Oct. 1972 101 p refs

(Contract F41609-71-C-0019; AF Proj. 7784)

(AD-752594) Avail: NTIS CSCL 06/17

Plastic goggles were produced which offer protection against several lasers. The goggles had a minimum optical density of 3 at 300-400, 840, 1,060, 780-1,760 and 2,755 to 14,000 nm. Cast plastic sheet was prepared which had similar protective capabilities. Over 300 organic compounds were evaluated and/or synthesized as possible near infrared absorbing compounds. Several of these structural systems offer promise for laser protection. The compounds were evaluated in a variety of plastics including cellulose propionate, polymethyl methacrylate, polycarbonate, polyethylene terephthalate, and polyvinyl chloride. The propionate and methacrylate were the polymers of choice for most of the work. Cadmium stannate was investigated as an absorber and was shown to have some interesting spectral properties. A discussion is presented on the correlation between structure and spectral properties of several of the compounds studied.

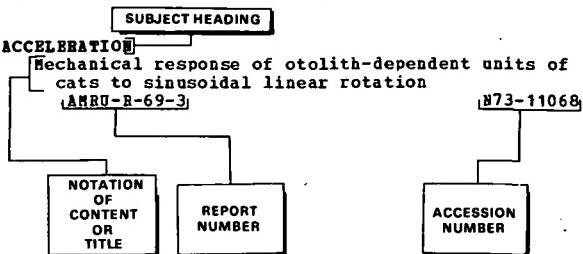
Author (GRA)

Subject Index

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 115)

MAY 1973

Typical Subject Index Listing



The Notation of Content (NOC), rather than the title of the document, is usually used to provide a more exact description of the subject matter. (AIAA occasionally uses the title in lieu of the NOC). The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

- ABSORPTANCE**
Reflectance, transmittance and absorbance spectra of normal and six types of maize leaves
[NASA-CR-1300321] N73-16065
- ABSTRACTS**
Abstracts on radiation and health physics
[BNWL-1651-VOL-2-PT-2] N73-16069
- ACCELERATION (PHYSICS)**
Nervous system functional changes due to forces of acceleration and weightlessness
[NASA-TT-P-733] N73-17105
- ACCELERATION STRESSES (PHYSIOLOGY)**
Seat reaction direction in an animal centrifuge.
A73-19478
- Disorienting effects of aircraft catapult launchings.
A73-19480
- Effect of accelerations on the thiamine-S/35/ distribution in the organism of white mice
A73-20977
- Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours
A73-20978
- Effect of accelerations on thiamine S-35 distribution in organs, tissues, and subcellular structures of white mice
N73-16044
- Morphological changes in juxtaglomerular apparatus in kidneys of rats during multihour exposure to accelerations in different directions
N73-16045
- Effects of hypoxia and acceleration stresses on enzyme activities in erythrocytes and blood plasma
[DLR-FB-72-71] N73-16070
- ACCELEROMETERS**
Accelerometers, electromyogram sensors, and telemetry system for measuring human body segment motions
[AD-751134] N73-16104
- ACID BASE EQUILIBRIUM**
Pulmonary respiration and acid-base state in hibernating marmots and hamsters.
A73-21613
- ACOUSTIC FATIGUE**
Noise effects on hearing conservation in aircraf and ground support personnel of aerospace operations
N73-17101

- ACTIVATION (BIOLOGY)**
Action of a serum protein on muscular contraction.
A73-21200
- ACTIVITY CYCLES (BIOLOGY)**
Activity cycle data for spacecrews of Soyuz 3 to 9 spacecrafts before, during and after space flights [JPRS-58173]
N73-16068
- ADAPTIVE CONTROL**
Human operators and automatic adaptive controllers - A comparative study on a particular control task.
A73-20399
- Stability behavior of adapting and untrained random logic nets, enabling intelligent interaction with environment
A73-20400
- Current status of models for the human operator as a controller and decision maker in manned aerospace systems.
A73-20587
- ADENOSINE DIPHOSPHATE (ADP)**
Adenonucleotides, NAD⁺, and NADH in skeletal muscles during intensive work and at rest
A73-19475
- ADENOSINE TRIPHOSPHATE (ATP)**
Adenonucleotides, NAD⁺, and NADH in skeletal muscles during intensive work and at rest
A73-19475
- ADRENAL METABOLISM**
Inhibition of the adrenocortical response to hypoxia by dexamethasone.
A73-19476
- Human endocrine-metabolic responses to graded oxygen pressures.
A73-19479
- Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress
A73-19644
- Mediator systems and respiratory function during an acute lethal loss of blood
A73-19645
- Catecholamine exchange in the hormonal and mediator links of the sympathoadrenal system under stress
A73-20367
- Analysis of some mechanisms of human stability to decompression of the lower portion of the body
A73-20987
- ADRENERGICS**
Time course of pulmonary vascular response to hypoxia in dogs.
A73-20168
- AERIAL RECONNAISSANCE**
Evaluation of device to train forward air controllers to communicate target locations [AD-751292] N73-16103
- AERODYNAMIC NOISE**
Structural vibration and noise effects on man in aerospace operations [AGARDOGRAPH-151]
N73-17098
- Airborne noise in aerospace operations and bioacoustics effects on man
N73-17100
- AEROEMBOLISM**
Pathogenesis of some respiration and circulation reactions to barometric pressure gradients
A73-20980
- AEROSOLS**
Cardiac toxicity of fluoroalkane gases for propelling aerosols in industry and household applications [AD-7514251]
N73-16090

AEROSPACE ENGINEERING

SUBJECT INDEX

AEROSPACE ENGINEERING

Structural vibrations in aerospace operations and effects on man N73-17099

AEROSPACE MEDICINE

Cosmic radiation and research carried out on board the 001 prototype Concorde A73-19211
Civil aviation medicine in the coming decade. A73-19484

Research and development related to space biology and medicine [JPRS-58010] N73-16041

Applications of aerospace technology in biology and medicine [NASA-CR-130544] N73-17047

Conference on occupational medicine support in NASA programs to prevent health and emotional problems in personnel [NASA-TM-X-69072] N73-17048

Occupational medicine procedures for personnel in lunar receiving laboratory for Apollo 11 crew members N73-17049

Medical examinations and protection procedures for NASA employees working in radiologically controlled areas N73-17050

Medical concepts and functional management in NASA Environmental Health Program N73-17056

Environmental health measures to prevent cabin atmosphere toxicity and provide drinking water standards in manned space flight applications N73-17058

Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073] N73-17064

Chorioretinal burn hazards of high intensity radiation sources in industry N73-17071

Structural vibration and noise effects on man in aerospace operations [AGARDOGRAPH-151] N73-17098

Prolonged weightlessness effects on physiological functions of dogs [NASA-TT-F-14672] N73-17110

AFFERENT NERVOUS SYSTEMS

Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem A73-19650

Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents A73-20003

Changes in the amplitudinal and temporal characteristics of somomotor-cortex evoked potentials after deactivation of spinocervical tracts in cats A73-20004

AGE FACTOR

Cardiovascular changes in middle-aged men during two years of training. A73-21504

Changes in electrocardiographs of Rhesus monkeys as function of age [NASA-TI-F-14675] N73-16062

AGING (BIOLOGY)

Photosensitized inhibitor formation in isolated, aging chloroplasts. A73-20453

AIR POLLUTION

Public health exposure limits to nitrogen oxide, hydrogen chloride, and hydrogen fluoride air pollutants [AD-751438] N73-16084

Public health exposure limits for air pollutants [AD-751437] N73-16088

Design and performance of exhaust hood with protective air current outside of hood surface N73-17063

AIR TRAFFIC CONTROL

Effectiveness of training device for air traffic communication and carrier landing control [AD-751556] N73-16101

AIRCRAFT COMPARTMENTS

Acute toxicity of brief exposures to HF, HCl, NO₂, and H₂S singly and in combination with CO in aircraft cabins [AD-751442] N73-16085

AIRCRAFT CONTROL

Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn. A73-19485

AIRCRAFT LANDING

Effectiveness of training device for air traffic communication and carrier landing control [AD-751556] N73-16101

AIRCRAFT NOISE

Noise effects on hearing conservation in aircREW and ground support personnel of aerospace operations N73-17101

AIRLINE OPERATIONS

Civil aviation medicine in the coming decade. A73-19484

ALDOSTERONE

Renal component of the antigravitation function of the organism A73-20976

Effects of an hyperoxic hypobaric environment on renin-alosterone in normal man. A73-21503

ALERTNESS

German monograph - Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram. A73-20391

Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem A73-21575

ALGAE

Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria. A73-21685

ALKYL COMPOUNDS

Protective effects of pyridinium salts against alkyl phosphate poisoning including influence of chemical and aging [BMVG-PBWT-72-8] N73-16072

ALTITUDE ACCLIMATIZATION

Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151

Mountain inhabitants physiological characteristics due to altitude effects, investigating human tolerance and adaptation to ambient environment A73-19212

High altitude acclimatization and mountain climbing effects on human organism, considering oculomotor, cardiovascular and respiratory responses and endurance A73-20991

Physiological effects of high mountain alpinism exercises on human body N73-16058

ALVEOLAR AIR

Effects of lung volume and disease on the lung nitrogen decay curve. A73-21501

AMMONIA

Influence of 100 percent anhydrous ammonia environment on body functions N73-17088

AMPLITUDE DISTRIBUTION ANALYSIS

Non-Gaussian properties of the EEG during sleep. A73-21465

ANALYSIS OF VARIANCE

Threshold variance analysis of monocular vs binocular visual stimulation in apparent movement perception A73-20262

ANALYTIC FUNCTIONS

On the approximation of the optical modulation transfer function /MTF/ by analytical functions. A73-20264

ANEMIAS		
Industrial health hazard in chronic exposure to monomethylhydrazine and dose related hemolytic anemia in humans [AD-751440]	N73-16087	
ANESTHESIA		
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man.	A73-21505	
ANGIOGRAPHY		
Pattern of blood flow within the heart - A stable system.	A73-21214	
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography.	A73-21801	
Inability of the submaximal treadmill stress test to predict the location of coronary disease.	A73-21802	
Ventriculographic patterns and hemodynamics in primary myocardial disease.	A73-21804	
ANIMALS		
Bibliography of wildlife movements and tracking systems [NASA-CR-130380]	N73-16040	
Animal species susceptibility to toxic effects of long term exposure to environmental monomethylhydrazine [AD-751441]	N73-16086	
ANTHROPOMETRY		
Color photographic system using grid projector and telecentric lenses for recording contours of human face for aircrew oxygen mask fitting [RAE-TR-711841]	N73-16099	
Multivariate limits for describing cockpit related anthropometric features of aviation personnel [AD-752032]	N73-17124	
ANTIADRENERGICS		
Inhibition of the adrenocortical response to hypoxia by dexamethasone.	A73-19476	
Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress	A73-19644	
Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension.	A73-21015	
ANTIBODIES		
The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies	A73-19647	
ANTICOAGULANTS		
Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current	A73-21321	
ANTIDIURETICS		
Renal component of the antigravitation function of the organism	A73-20976	
ANTIDOTES		
Protective effects of pyridinium salts against alkyl phosphate poisoning including influence of chemical and aging [BMVG-FEW7-72-8]	N73-16072	
ANTIGRAVITY		
Renal component of the antigravitation function of the organism	A73-20976	
AQUEOUS SOLUTIONS		
Effectiveness of sodium hydrocarbonate as means for treating and preventing motion sickness	N73-16057	
ARE (ANATOSY)		
Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress	A73-19643	
ARMED FORCES (UNITED STATES)		
Survey of industrial hygiene and safety in Air Forces operations [AD-751897]	N73-17126	
ARRHYTHMIA		
Relation of electrolyte disturbances to cardiac arrhythmias.	A73-21807	
ARTIFICIAL GRAVITY		
Seat reaction direction in an animal centrifuge.	A73-19478	
ASSIMILATION		
Contrast and assimilation effects analysis based on receptive field models of vertebrate retinal function	A73-20812	
ASTIGMATISM		
Meridional amblyopia - Evidence for modification of the human visual system by early visual experience.	A73-21562	
Weightlessness effects on development of vestibular apparatus and ocular nystagmus in rat, using chronic 2g centrifuge, [NASA-CR-114569]	N73-17112	
ASTRONAUT PERFORMANCE		
Emotional stresses during a space flight	A73-19297	
ASTRONAUTS		
Measurement of radiation exposure of astronauts by radiochemical techniques [NASA-CR-130538]	N73-17114	
ATTENTION		
Attention field and perception probability distribution mechanisms of Muller-Lyer illusion due to angle contour	A73-20255	
ATTITUDE (INCLINATION)		
Seat reaction direction in an animal centrifuge.	A73-19478	
Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn.	A73-19485	
ATTITUDE INDICATORS		
An instrument panel on an image tube in color	A73-21543	
AUDITORY TASKS		
Comparison of human operator critical tracking task performance with aural and visual displays.	A73-21667	
AUTOKINESIS		
Autokinetic movement as a function of the implied movement of target shape.	A73-19549	
Random dot pattern luminance and contrast effects on limiting inter-stimulus interval for visual apparent motion masking by bright field	A73-20256	
Threshold variance analysis of monocular vs binocular visual stimulation in apparent movement perception	A73-20262	
AUTOMATA THEORY		
Automaton synthesis and perceptron learning for controlled objects classification according to unknown features, noting adaptive relationships between retina and associative elements	A73-20047	
Stability behavior of adapting and untrained random logic nets, enabling intelligent interaction with environment	A73-20400	
AUTOMATIC CONTROL		
Periodic health examinations and automatic processing of medical histories for detection and prevention of human diseases	N73-17074	
Automated procedures for Passive Immune Agglutination system [NASA-CR-128731]	N73-17107	
AUTOMATIC TEST EQUIPMENT		
Management of NASA employee health problems by automated medical system	N73-17079	
AVIONICS		
An instrument panel on an image tube in color	A73-21543	
AZO COMPOUNDS		
The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics.	A73-21464	

B**BACILLUS**

Spin-labeling studies on the membrane of a facultative thermophilic bacillus. A73-20027

BACTERIA

Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria. A73-19483

Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria. A73-19500

Survival of Arthrobacter crystallopoietes during prolonged periods of extreme desiccation. A73-20026

Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria. A73-21685

Differential light scattering patterns for identifying different species of bacteria N73-17090

BARORECEPTORS

A mathematical model to assess changes in the baroreceptor reflex. A73-21475

BED REST

Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia A73-20985

Regulation of vertical posture after Soyuz 6, 7, and 8 flights and after 120-day bed rest experiment N73-16052

Effect of atmosphere with increased oxygen and carbon dioxide content on human orthostatic tolerance following 10 days of bedrest N73-16055

BERYLLIUM ALLOYS

Toxicity and safety hazard of dry beryllium copper alloy machining for human operator N73-17059

BIBLIOGRAPHIES

Bibliography of wildlife movements and tracking systems [NASA-CR-130380] N73-16040

BINOCULAR VISION

Threshold variance analysis of monocular vs binocular visual stimulation in apparent movement perception A73-20262

BIOASSAY

Soil sampling and microorganism analysis in planetary spacecraft assembly area for prevention of Mars contamination [NASA-CR-130009] N73-16059

Animal species susceptibility to toxic effects of long term exposure to environmental monomethylhydrazine [AD-751441] N73-16086

Risk scoring system for identifying subjects with high risk to coronary heart disease N73-17080

Microbiological assay procedures for spacecraft cabling, antennas, solar panels, and thermal blankets [NASA-CR-130383] N73-17109

BIOCHEMISTRY

Modified rhodopsin in the pigment epithelium. A73-20263

BIOCLIMATOLOGY

Thermal protective garment using independent regional control of coolant temperature. A73-19481

BIOCONTROL SYSTEMS

Ergatic organism defined as multipurpose nonautonomous control system with homeostasis with respect to functional operations conservation A73-20048

Human operators and automatic adaptive controllers - A comparative study on a particular control task. A73-20399

Digital computer studies of respiratory control. A73-20577

Renal component of the antigravitation function of the organism A73-20976

Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322

Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/. A73-21806

BIODYNAMICS

Human tendon stress recovery after load removal as function of time, sex, age and side differences A73-20033

A method for chronocyclographical motion analysis with the aid of an on-line computer A73-20036

A model for the elastic properties of the lung and their effect on expiratory flow. A73-21502

BIOELECTRIC POTENTIAL

Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents A73-20003

Changes in the amplitudinal and temporal characteristics of somatosensor-cortex evoked potentials after deactivation of spinocervical tracts in cats A73-20004

Physiological mechanisms of evoked-potential habituation in the visual analyzer A73-20006

German monograph - The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials. A73-20389

Evoked potential correlates of expected stimulus intensity. A73-21225

Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropic hormone excretion levels at various stages of ontogenesis A73-21319

Relation of electrolyte disturbances to cardiac arrhythmias. A73-21807

BIOELECTRICITY

Rabbit hippocampal neuron activity relation to theta-wave phases from cell potential and extracellular recording analyses A73-20005

BIOENGINEERING

Design and development of biomedical prosthetic and electronic devices [NASA-CR-130022] N73-16093

BIOGENY

Silk fibroin, collagen, glycoproteins, keratin and protamines formation in single evolutionary event by de novo synthesis of DNA A73-19219

BIOINSTRUMENTATION

Linearity of the horizontal component of the electro-oculogram. A73-19125

Modulated light transmission for electrical isolation in a multichannel physiological monitoring system. A73-19482

A respirometer for the continuous measurement of respiration volume with remote transmission A73-20035

A method for chronocyclographical motion analysis with the aid of an on-line computer A73-20036

Method for measuring the contractions of small hearts in organ culture. A73-21218

A method for electrocardiogram recording in Rhesus monkeys A73-21324

Heated Fleisch pneumotachometer - A calibration procedure. A73-21509

SUBJECT INDEX

BLOOD PLASMA

- An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510
- BIOLOGICAL EFFECTS**
- Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation A73-20981
 - Biological effects of lasting hypodynamia on young albino rats in 62 day confinement, considering weight, growth and sexual behavior A73-20983
 - Physiology of depressed metabolic states and gastrointestinal responses to ionizing radiation [NASA-CR-130381] N73-16038
 - Effect of prolonged hypodynamia on rat biology N73-16050
 - Abstracts on radiation and health physics [BNWL-1651-VOL-2-PT-2] N73-16069
 - Mortality and blood cell count variation in mice after irradiation with fast neutrons and X rays [BMVG-FBWT-72-16] N73-16077
 - Influence of 100 percent anhydrous ammonia environment on body functions N73-17088
 - Occupational hazards and adverse biological effects of ultraviolet radiation N73-17094
- BIOLOGICAL EVOLUTION**
- Stochastic model application to divergence of horse-pig lineage from common ancestor in terms of hemoglobin and fibrinopeptides alpha and beta chains A73-19218
 - Ribosomal RNA base composition and molecular evolution in plants and animals of various taxonomic groups A73-19220
 - Electrophysiological investigation of suprasegmental motor control systems evolution through Cyclostomata-Primate series, noting preservation of reticulomotor neuron projection characteristics A73-20001
- BIOLOGY**
- Bibliography of wildlife movements and tracking systems [NASA-CR-130380] N73-16040
 - Applications of aerospace technology in biology and medicine [NASA-CR-130544] N73-17047
- BIOMEDICAL DATA**
- Emotional stresses during a space flight A73-19297
- BIOMETRICS**
- Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
 - On-line computer analysis and breath-by-breath graphical display of exercise function tests. A73-21511
 - Accelerometers, electromyogram sensors, and telemetry system for measuring human body segment motions [AD-751134] N73-16104
- BIONICS**
- Predictions of the dynamic response of the lung. A73-19477
 - Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648
 - Ergatic organism defined as multipurpose nonautonomous control system with homeostasis with respect to functional operations conservation A73-20048
 - Human operators and automatic adaptive controllers - A comparative study on a particular control task. A73-20399
 - Stability behavior of adapting and untrained random logic nets, enabling intelligent interaction with environment A73-20400
 - Digital computer studies of respiratory control. A73-20577
- A model to predict respiration from VCG measurements. A73-20578
- Current status of models for the human operator as a controller and decision maker in manned aerospace systems. A73-20587
- Contrast and assimilation effects analysis based on receptive field models of vertebrate retinal function A73-20812
- Blood vessels simulation by muscle pump represented by elastically deformable pipe with valves, solving Navier-Stokes equation for viscous fluid flow A73-21375
- Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
- Human retina-patterned ideal perceiving machine to calculate visual acuities for spatial arrangement in line figures A73-21564
- BIOPHYSICS**
- Biophysical mechanisms of noninvasive measurement of CVP in man [NASA-CR-130348] N73-16039
- BIOTECHNOLOGY**
- Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648
 - Two dimensional eye movement recording using a photo-electric matrix method. A73-20259
- BIOTELEMETRY**
- A spirometer for the continuous measurement of respiration volume with remote transmission A73-20035
 - Accelerometers, electromyogram sensors, and telemetry system for measuring human body segment motions [AD-751134] N73-16104
- BLIGHT**
- Multispectral remote sensing techniques for identification of corn blight disease [NASA-TM-1-69055] N73-16064
- BLOOD**
- Effect of accelerations on the thiamine-S/35 distribution in the organism of white mice A73-20977
 - Mortality and blood cell count variation in mice after irradiation with fast neutrons and X rays [BMVG-FBWT-72-16] N73-16077
 - Stabilization methods in collecting and shipping of human sera for chemical analyses N73-17053
- BLOOD CIRCULATION**
- Central, femoral, and brachial circulation during exercise in hypoxia. A73-21506
- BLOOD COAGULATION**
- Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current A73-21321
 - Intravascular platelet aggregation in the heart induced by stress. A73-21805
- BLOOD FLOW**
- Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta. A73-21199
 - Pattern of blood flow within the heart - A stable system. A73-21214
 - Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
- BLOOD PLASMA**
- The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture A73-19649

BLOOD PRESSURE

SUBJECT INDEX

- Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta. A73-21199
- Changes in total plasma content of electrolytes and proteins with maximal exercise. A73-21507
- BLOOD PRESSURE**
A mathematical model to assess changes in the baroreceptor reflex. A73-21475
- Significance of the Bohr and Haldane effects in the pulmonary capillary. A73-21614
- Biophysical mechanisms of noninvasive measurement of CVP in man [NASA-CB-130348] N73-16039
- Blood pressure and cholesterol level screening for preventing heart diseases in flight crews of commercial airline N73-17076
- BLOOD VESSELS**
Blood vessels simulation by muscle pump represented by elastically deformable pipe with valves, solving Navier-Stokes equation for viscous fluid flow A73-21375
- BLOOD VOLUME**
Mediator systems and respiratory function during an acute lethal loss of blood A73-19645
- Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
- BODY COMPOSITION (BIOLOGY)**
Effect of accelerations on the thiamine-S/35/ distribution in the organism of white mice A73-20977
- Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- BODY MEASUREMENT (BIOLOGY)**
A method for chronocyclographical motion analysis with the aid of an on-line computer A73-20036
- BODY WEIGHT**
Biological effects of lasting hypodynamia on young albino rats in 62 day confinement, considering weight, growth and sexual behavior A73-20983
- BOEING 720 AIRCRAFT**
Computerized simulation of passenger emergency evacuation efficiency using Boeing 720 aircraft models [FAA-AM-72-301] N73-17119
- BRAIN**
Russian book - Tissue, oxygen in the presence of extremal flight factors. A73-19425
- Electrophysiological investigation of suprasegmental motor control systems evolution through Cyclostomata-Primate series, noting preservation of reticulomotor neuron projection characteristics A73-20001
- Inter-hemispheric transfer of meaningful visual information in normal human subjects. A73-20123
- Single cell analysis of saturation discrimination in the macaque. A73-21568
- BRAIN DAMAGE**
The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies A73-19647
- BRAIN STEM**
Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem A73-19650
- Physiological mechanisms of evoked-potential habituation in the visual analyzer A73-20006
- BRIGHTNESS DISCRIMINATION**
Intrinsic light brightness and intensity estimation tests for foveal and peripheral retina under photopic and scotopic stimuli A73-20257
- Evoked potential correlates of expected stimulus intensity. A73-21225
- The brightness of coloured flashes on backgrounds of various colours and luminances. A73-21565
- Analysis of transient visual sensations above the flicker fusion frequency. A73-21566
- BROMINE COMPOUNDS**
Effects of chemical fire extinguishing agents containing bromotrifluoromethane on cardiovascular and nervous systems of dogs, monkeys, and baboons [AGARD-R-599] N73-17106
- BROWBIAZ MOVEMENTS**
Cinemicrographic study of the development of subsurface colonies of *Staphylococcus aureus* in soft agar. A73-21828
- BURBS (INJURIES)**
Chorioretinal burn hazards of high intensity radiation sources in industry. N73-17071
- C**
- CANCER**
Rotating target providing high yield neutrons by He-4 reaction for cancer therapy [NASA-TM-X-68179] N73-16067
- Routine proctosigmoidoscopic examinations of asymptotic NASA personnel for cancer prevention N73-17061
- CAPILLARIES (ANATOMY)**
Intravascular platelet aggregation in the heart induced by stress. A73-21805
- CAPILLARY FLOW**
Significance of the Bohr and Haldane effects in the pulmonary capillary. A73-21614
- CARBOHYDRATE METABOLISM**
Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria. A73-19500
- Effect of low temperature on metabolism of rat liver slices and epididymal fat pads. A73-20170
- CARBON MONOXIDE**
Acute toxicity of brief exposures to HF, HCl, NO₂, and HCN singly and in combination with CO in aircraft cabins [AD-751442] N73-16085
- CARBOXYHEMOGLOBIN TEST**
Significance of the Bohr and Haldane effects in the pulmonary capillary. A73-21614
- CARDIAC AUBICLES**
Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215
- CARDIAC VENTRICLES**
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography. A73-21801
- Ventriculographic patterns and hemodynamics in primary myocardial disease. A73-21804
- CARDIOGRAPHY**
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms. A73-19124
- The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. A73-19932
- Pattern of blood flow within the heart - A stable system. A73-21214

SUBJECT INDEX

CHEMORECEPTORS

Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography.	A73-21801	CATABOLISM	Thermal factor and dehydration influences on protidic and lipidic catabolisms of young men with partial food deprivation in hot climate, discussing metabolic balances
Ventriculographic patterns and hemodynamics in primary myocardial disease.	A73-21804	CATALYTIC ACTIVITY	Proton magnetic resonance spectra of ribonuclease A inhibitor complexes, noting effect on catalytic activity [BNWG-FBWT-72-13]
CARDIOLOGY		CATAPULTS	Disorienting effects of aircraft catapult launchings.
Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches.	A73-19152	CATECHOLAMINE	Catecholamine exchange in the hormonal and mediator links of the sympathoadrenal system under stress
The contractile function of the myocardium in two types of cardiac adaptation to a chronic load.	A73-1931	CELL DIVISION	Mitotic activity in dorsal epidermis of Rana pipiens.
A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man.	A73-20369	CELLS (BIOLOGY)	Rabbit hippocampal neuron activity relation to theta-wave phases from cell potential and extracellular recording analyses
Dynamic electrocardiographic standardization for detecting cardiac risk factor in personnel	N73-17066	CELLULAR SYSTEM	Single cell analysis of saturation discrimination in the macaque.
Long term exercise effects on cardiovascular response in NASA personnel with periodic ergometric evaluation	N73-17067	CENTRAL NERVOUS SYSTEM	Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/.
CARDIOVASCULAR SYSTEM		CENTRIFUGES	Information processing in the visual system.
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms.	A73-19124	CENTRIFUGING STRESS	Central nervous system stresses effects estimation, discussing ocular positioning movements functional significance and psychological processes
Sinus venosus atrial septal defect - Analysis of fifty cases.	A73-20368	CEREBRAL CORTEX	Seat reaction direction in an animal centrifuge.
Analysis of some mechanisms of human stability to decompression of the lower portion of the body	A73-20987	CEREBROSPINAL FLUID	Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn.
High altitude acclimatization and mountain climbing effects on human organism, considering oculomotor, cardiovascular and respiratory responses and endurance	A73-20991	CEREBRUM	Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculus of the cat spinal cord
Cardiovascular changes in middle-aged men during two years of training.	A73-21504	CHEMICAL ANALYSIS	Changes in the amplitudinal and temporal characteristics of sensomotor-cortex evoked potentials after deactivation of spinocervical tracts in cats
Central, femoral, and brachial circulation during exercise in hypoxia.	A73-21506	CHEMICAL INDICATORS	Cerebral localization of speech, discussing cortical lesions, aphasia and mental activity correlation theories
Cardiac toxicity of fluoroalkane gases for propelling aerosols in industry and household applications [AD-751425]	N73-16090	CHEMORECEPTORS	Effects of monometylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232]
Cardiovascular effects of fluorocarbon exposure, emphasizing epinephrine sensitivity [AD-751427]	N73-16091		Ontogenetic cerebrospinal reflex activity studies, covering spinal cord morphology, reflex arches, inhibition, intracentral responses and post-tetanic potentiation
CAROTID SINUS REFLEX			Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress
A mathematical model to assess changes in the baroreceptor reflex.	A73-21475		A73-20002
CASE HISTORIES			A73-20004
Case histories of valvular cardiopathies in military pilots, determining tolerance to flight	A73-19209		Cerebral localization of speech, discussing cortical lesions, aphasia and mental activity correlation theories
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant	A73-21540		A73-21425
Conference on occupational medicine support in NASA programs to prevent health and emotional problems in personnel [NASA-TM-X-69072]	N73-17048		CEREBROSPINAL FLUID
Multiphase health screening and medical history questionnaire for preventive/occupational physical examinations	N73-17052		Effects of monometylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232]
Automated medical history questionnaire for screening industrial personnel and scheduling physical examinations	N73-17060		N73-16092
Periodic health examinations and automatic processing of medical histories for detection and prevention of human diseases	N73-17074		CEREBRUM
Automated medical record system for identifying and managing medical problems for Navy	N73-17087		Ontogenetic cerebrospinal reflex activity studies, covering spinal cord morphology, reflex arches, inhibition, intracentral responses and post-tetanic potentiation
			A73-20366
			CHEMICAL ANALYSIS
			Stabilization methods in collecting and shipping of human sera for chemical analyses
			N73-17053
			CHEMICAL INDICATORS
			Analysis of indicator distribution in the determination of cardiac output by thermal dilution.
			A73-21216
			CHEMORECEPTORS
			Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress
			A73-19644

CHEMOTHERAPY

SUBJECT INDEX

CHEMOTHERAPY	
Effect of some pharmacological preparations on the fall-out nystagmus and Bechterew nystagmus	A73-20982
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness	A73-20990
The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics.	A73-21464
Antidiabetic medications and aircrew	A73-21541
CHLORINE FLUORIDES	
Symptomatic and pathological information from acute toxicity exposure of chlorine pentafluoride [AD-751452]	N73-16078
CHLOROPLASTS	
Photosensitized inhibitor formation in isolated, aging chloroplasts.	A73-20453
CHOLESTEROL	
Blood pressure and cholesterol level screening for preventing heart diseases in flight crews of commercial airline	N73-17076
Influence of repeated test and dietary counseling on hypercholesterolemia control in NASA employees	N73-17081
CHOLINERGICS	
Mediator systems and respiratory function during an acute lethal loss of blood	A73-19645
CHRONIC CONDITIONS	
Chronic disease health trends and mortality rates in employee population of NASA Goddard Space Flight Center	N73-17086
CHRONOPHOTOGRAPHY	
A method for chronocyclographical motion analysis with the aid of an on-line computer	A73-20036
Cinemicrographic study of the development of subsurface colonies of Staphylococcus aureus in soft agar.	A73-21828
CIRCADIAN RHYTHMS	
Diurnal rhythm oscillations of fat metabolism indices in healthy young men	A73-19646
Mitotic activity in dorsal epidermis of Rana pipiens.	A73-20456
Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness	A73-20989
CIRCULATORY SYSTEM	
Pathogenesis of some respiratory and circulatory reactions accompanying drop in barometric pressure	N73-16047
CIVIL AVIATION	
Civil aviation medicine in the coming decade.	A73-19484
Renal lithiasis among civil operating aircrew	A73-21536
Proteinuria and civil aviation aircrew	A73-21538
Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073]	N73-17064
CLINICAL MEDICINE	
Blood lipid diagnostic and therapeutic measures to prevent heart disease in humans	N73-17073
Risk scoring system for identifying subjects with high risk to coronary heart disease	N73-17080
Clinical analysis of relationship between VFB and mortality rate in patient with acute myocardial infarctions	N73-17083
Automated medical record system for identifying and managing medical problems for Navy	N73-17087
Clinical practice and problems associated with urine analysis	N73-17089
Survey of industrial hygiene and safety in Air Forces operations	[AD-751897] N73-17126
CLOSED ECOLOGICAL SYSTEMS	
Recorded observations of crew member activities during Tektite 2 underwater habitability study [NASA-CR-130034]	N73-16094
Habitability factors during long-term space and undersea missions in confined habitats [NASA-CR-130537]	N73-17123
COCHLEA	
Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem	A73-19650
COCKPITS	
Multivariate limits for describing cockpit related anthropometric features of aviation personnel [AD-752032]	N73-17124
CODING	
Neural channel mechanism for real light and equivalent background coding, using test flashes under bleaching and field adaptation	A73-20258
COLD ACCLIMATIZATION	
Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold	A73-21323
COLOR VISION	
Color naming and hue discrimination in congenital tritanopia and tritanomaly.	A73-20251
Stimulus effect on spatial summation of color receptive pathways and discrimination thresholds as function of color, gradient, retinal illumination and field size	A73-20254
Photochemical receptor mechanism of chromatic vision and scotopic contrast hue sensation due to cone and rod activity interaction	A73-20261
The role of colour perception and 'pattern' recognition in stereopsis.	A73-20266
The brightness of coloured flashes on backgrounds of various colours and luminances.	A73-21565
Single cell analysis of saturation discrimination in the macaque.	A73-21568
COMMUNICATING	
German monograph on human information transmission by multidimensional tactile stimuli investigation using method of learned signals identification	A73-20393
COMMUNICATION EQUIPMENT	
Effectiveness of training device for air traffic communication and carrier landing control [AD-751556]	N73-16101
COMPENSATORY TRACKING	
Study of differences between left and right hand performance in compensatory tracking task [RAE-TB-72117]	N73-16098
Linear rating scale for selecting tracking task parameters by subjective operator [AD-752036]	N73-17125
COMPUTER GRAPHICS	
On-line computer analysis and breath-by-breath graphical display of exercise function tests.	A73-21511
COMPUTER PROGRAMMING	
Computerized multivariate scheduling of physical examinations for NASA personnel in clinical intervention program	N73-17068
COMPUTER TECHNIQUES	
A method for chronocyclographical motion analysis with the aid of an on-line computer	A73-20036
German monograph - Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram.	A73-20391
COMPUTERIZED SIMULATION	
Digital computer studies of respiratory control.	A73-20577

SUBJECT INDEX

DATA PROCESSING

Pilot performance during simulated standard instrument procedure turn with and without predictor display [NASA-TM-X-62201]	N73-17118	CORONARY CIRCULATION Pattern of blood flow within the heart - A stable system. A73-21214
Computerized simulation of passenger emergency evacuation efficiency using Boeing 720 aircraft models [FAA-AM-72-30]	N73-17119	Inability of the submaximal treadmill stress test to predict the location of coronary disease. A73-21802
CONCENTRATION (COMPOSITION) X ray fluorescence analysis for determining lead content of paint on pencils in Goddard supply system	N73-17097	CORTICOSTEROIDS Inhibition of the adrenocortical response to hypoxia by dexamethasone. A73-19476
CONCORDE AIRCRAFT Solar flare frequency and associated physical phenomena diversity, discussing earth atmosphere protective effects and impact on Concorde flights	A73-19210	COSMIC RAYS Cosmic radiation and research carried out on board the 001 prototype Concorde A73-19211
Cosmic radiation and research carried out on board the 001 prototype Concorde	A73-19211	COSMONAUTS Indices of emotional stress in cosmonauts during Voskhod 2 and Soyuz flights [JPRS-58039] N73-17104
CONDITIONING (LEARNING) German monograph on human information transmission by multidimensional tactile stimuli investigation using method of learned signals identification	A73-20393	CRITICAL FLICKER FUSION Dynamic properties of vision. III - Twin flashes, single flashes and flickerfusion. A73-20253
CONFERENCES Conference on occupational medicine support in NASA programs to prevent health and emotional problems in personnel [NASA-TM-X-69072]	N73-17048	Cyclofusional stimulation effects on retinal image disparity in terms of central component and Panum fusional areas A73-20265
Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073]	N73-17064	Analysis of transient visual sensations above the flicker fusion frequency. A73-21566
Conference on occupational and environmental medical services provided to NASA employees [NASA-TM-X-69074]	N73-17078	CROP VIGOR Multispectral remote sensing techniques for identification of corn blight disease [NASA-TM-X-69055] N73-16064
CONFINEMENT Biological effects of lasting hypodynamia on young albino rats in 62 day confinement, considering weight, growth and sexual behavior	A73-20983	CROSS COUPLING Heuristic response strategies and operator performance errors as function of practice in cross coupled pursuit tracking control tasks A73-19548
Electronic detectors and computer software for analyzing human electroencephalographs in isolated environment [AD-751272]	N73-16105	CULTURE TECHNIQUES The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture A73-19649
CONGENITAL ANOMALIES Color naming and hue discrimination in congenital tritanopia and tritanomaly.	A73-20251	Method for measuring the contractions of small hearts in organ culture. A73-21218
CONTOURS Color photographic system using grid projector and telecentric lenses for recording contours of human face for aircrew oxygen mask fitting [RAE-TB-71184]	N73-16099	Cinemicrographic study of the development of subsurface colonies of Staphylococcus aureus in soft agar. A73-21828
CONTROL THEORY Ergatic organism defined as multipurpose nonautonomous control system with homeostasis with respect to functional operations conservation	A73-20048	Automatic inoculating device for agar trays using cotton swab or loop [NASA-CASE-LAB-11074-1] N73-16096
CONTROLLED ATMOSPHERES Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere	A73-20979	CURING Nonsporidical methods for solvent degradation of cured RTV 41 silicon potting compound and chemical curing effects on decontamination properties [NASA-CR-130720] N73-17111
Thermoregulation reactions of rats in hypoxic atmosphere with nitrogen and helium dilution	N73-16046	CYBERNETICS Information processing in the visual system. A73-20374
Effect of atmosphere with increased oxygen and carbon dioxide content on human orthostatic tolerance following 10 days of bedrest	N73-16055	
COOLING Evaluation of sex difference in thermal sensitivity in men and women [NASA-CR-114564]	B73-17113	D
COBIOLIS EFFECT Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn.	A73-19485	DARK ADAPTATION Intrinsic light brightness and intensity estimation tests for foveal and peripheral retina under photopic and scotopic stimuli A73-20257
CORE Multispectral remote sensing techniques for identification of corn blight disease [NASA-TM-X-69055]	B73-16064	Photochemical receptor mechanism of chromatic vision and scotopic contrast hue sensation due to cone and rod activity interaction A73-20261
		DATA ACQUISITION Coding data of 2565 individual human altitude chamber tests [NASA-CR-114550] N73-16066
		DATA BASES Automated medical record system for identifying and managing medical problems for Navy N73-17087
		DATA PROCESSING Electronic detectors and computer software for analyzing human electroencephalographs in isolated environment [AD-751272] N73-16105

DATA RECORDING

SUBJECT INDEX

DATA RECORDING

the influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects.

A73-19932

DECISION MAKING

current status of models for the human operator as a controller and decision maker in manned aerospace systems.

A73-20587

choice reaction tasks for discriminating individual skill potentials in information handling situations
[AD-752073]

N73-17115

linear rating scale for selecting tracking task parameters by subjective operator
[AD-752036]

N73-17125

DECOMPRESSION SICKNESS

pathogenesis of some respiration and circulation reactions to barometric pressure gradients

A73-20980

analysis of some mechanisms of human stability to decompression of the lower portion of the body

A73-20987

pathogenesis of some respiratory and circulatory reactions accompanying drop in barometric pressure

N73-16047

analysis of mechanisms of human tolerance to lower body decompression

N73-16054

DEGRADATION

nonsporicidal methods for solvent degradation of cured RTV 41 silicon potting compound and chemical curing effects on decontamination properties

[NASA-CR-130720]

N73-17111

DEOXYRIBONUCLEAR ACID

silk fibroin, collagen, glycoproteins, keratin and protamines formation in single evolutionary event by de novo synthesis of DNA

A73-19219

DESERT ADAPTATION

thermal factor and dehydration influences on protidic and lipidic catabolisms of young men with partial food deprivation in hot climate, discussing metabolic balances

A73-21248

DEVICES

design and development of biomedical prosthetic and electronic devices
[NASA-CR-130022]

N73-16093

DIABETES MELLITUS

Antidiabetic medications and aircrav

A73-21541

DIAGNOSIS

Dynamic electrocardiographic standardization for detecting cardiac risk factor in personnel

N73-17066

periodic health examinations and automatic processing of medical histories for detection and prevention of human diseases

N73-17074

Clinical practice and problems associated with urine analysis

N73-17089

DICHLORIDES

Effects of continuous methylene chloride exposure on spontaneous activity of mice for two weeks
[AD-751435]

N73-16082

DIETS

influence of repeated test and dietary counseling on hypercholesterolemia control in NASA employees

N73-17081

DIFFRACTION PATTERNS

Differential light scattering patterns for identifying different species of bacteria

N73-17090

DISEASES

Remote sensing techniques for detection and prevention of Rocky Mountain spotted fever, Encephalitis, Malaria, and Red Tide environmental health problems
[NASA-CR-128727]

N73-16060

chronic disease health trends and mortality rates in employee population of NASA Goddard Space Flight Center

N73-17086

DISORIENTATION

Disorienting effects of aircraft catapult launchings.

A73-19480

DISPLAY DEVICES

Comparison of human operator critical tracking task performance with aural and visual displays.

A73-21667

DOGS

Morphological changes in testes and spermatogenesis process of dogs subjected to chronic and combined gamma irradiation

N73-16048

Prolonged weightlessness effects on physiological functions of dogs
[NASA-TT-F-14672]

N73-17110

DOPPLER EFFECT

Biophysical mechanisms of noninvasive measurement of CVP in man
[NASA-CR-130348]

N73-16039

DRUGS

Guinea pigs used to determine effect of intramuscular injections of drugs on fall-out and Bekhterev nystagmus occurring after unilateral and bilateral labyrinthectomies

N73-16049

DRYING

Survival of Arthrobacter crystalllopoietes during prolonged periods of extreme desiccation.

A73-20026

DYNAMIC RESPONSE

Predictions of the dynamic response of the lung.
A73-19477

Dynamic electrocardiographic standardization for detecting cardiac risk factor in personnel

N73-17066

E

EARTH ATMOSPHERE

Solar flare frequency and associated physical phenomena diversity, discussing earth atmosphere protective effects and impact on Concorde flights

A73-19210

EARTH RESOURCES

Problems of environmental pollution and natural resource depletion caused by man
[JPRS-58113]

N73-17121

ECOLOGY

Problems of environmental pollution and natural resource depletion caused by man
[JPRS-58113]

N73-17121

EFFERENT NERVOUS SYSTEMS

Electrophysiological investigation of suprasegmental motor control systems evolution through Cyclostomata-Primate series, noting preservation of reticulomotor neuron projection characteristics

A73-20001

ELASTIC PROPERTIES

Blood vessels simulation by muscle pump represented by elastically deformable pipe with valves, solving Navier-Stokes equation for viscous fluid flow

A73-21375

A model for the elastic properties of the lung and their effect on expiratory flow.

A73-21502

ELECTRIC STIMULI

Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents

A73-20003

Electrical stimulation effects of human eye on photic threshold for square wave vision as function of wavelength, orientation and spatial frequency

A73-20260

ELECTROCARDIOGRAPHY

Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches.

A73-19152

Orthogonal versus planar vector-electrocardiography.

A73-19930

A method for electrocardiogram recording in Rhesus monkeys

A73-21324

SUBJECT INDEX

ENZYMOLOGY

- Changes in electrocardiographs of Rhesus monkeys as function of age [NASA-TT-P-14675] N73-16062
- Dynamic electrocardiography in periodic health examinations for detection of cardiac abnormalities N73-17065
- Dynamic electrocardiographic standardization for detecting cardiac risk factor in personnel N73-17066
- Electrocardiographic stress testing for determining influence of occupational and other stresses on ischemic heart disease N73-17082
- ELECTRODES**
- A method for electrocardiogram recording in Rhesus monkeys A73-21324
 - An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510
- ELECTROENCEPHALOGRAPHY**
- Rabbit hippocampal neuron activity relation to theta-wave phases from cell potential and extracellular recording analyses A73-20005
 - German monograph - Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram. A73-20391
 - Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropic hormone excretion levels at various stages of ontogenesis A73-21319
 - The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. A73-21464
 - Non-Gaussian properties of the EEG during sleep. A73-21465
 - Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
 - Electronic detectors and computer software for analyzing human electroencephalographs in isolated environment [AD-751272] N73-16105
- ELECTROLYTE METABOLISM**
- Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. A73-21503
 - Changes in total plasma content of electrolytes and proteins with maximal exercise. A73-21507
 - Relation of electrolyte disturbances to cardiac arrhythmias. A73-21807
- ELECTROMYOGRAPHY**
- Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold A73-21323
 - Accelerometers, electromyogram sensors, and telemetry system for measuring human body segment motions [AD-751134] N73-16104
- ELECTRON MOBILITY**
- Photosensitized inhibitor formation in isolated, aging chloroplasts. A73-20453
- ELECTROPHYSIOLOGY**
- Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches. A73-19152
 - Modulated light transmission for electrical isolation in a multichannel physioloical monitoring system. A73-19482
 - Evoked potential correlates of expected stimulus intensity. A73-21225
 - Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current A73-21321
- Relation of electrolyte disturbances to cardiac arrhythmias. A73-21807
- ELECTRORETINOGRAPHY**
- Linearity of the horizontal component of the electro-oculogram. A73-19125
- EMOTIONAL FACTORS**
- Emotional stresses during a space flight A73-19297
 - Indices of emotional stress in cosmonauts during Voskhod 2 and Soyuz flights [JPBS-58039] N73-17104
- ENDOCRINE SECRETIONS**
- Human endocrine-metabolic responses to graded oxygen pressures. A73-19479
- ENERGY DISTRIBUTION**
- Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
- ENTHALPY**
- Enthalpy values for reaction of retarding mononucleotides with ribonuclease and thermodynamic parameters for enzyme inhibitor interactions [PMVG-FBWT-72-12] N73-16073
- ENVIRONMENT EFFECTS**
- Mountain inhabitants physiological characteristics due to altitude effects, investigating human tolerance and adaptation to ambient environment A73-19212
- ENVIRONMENT POLLUTION**
- Problems of environmental pollution and natural resource depletion caused by man [JPBS-58113] N73-17121
- ENVIRONMENTAL CONTROL**
- Remote sensing techniques for detection and prevention of Rocky Mountain spotted fever, Encephalitis, Malaria, and Red Tide environmental health problems [NASA-CR-128727] N73-16060
 - Medical concepts and functional management in NASA Environmental Health Program N73-17056
 - Industrial hygiene, radiological health, and spacecraft sanitation studies in NASA Environmental Health Program N73-17057
 - Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073] N73-17064
- ENZYME ACTIVITY**
- Transglucosidase activity of heart-muscle per-glucohydrolase A73-21136
 - Action of a serum protein on muscular contraction. A73-21200
 - Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215
 - Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. A73-21503
 - Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
 - Effects of hypoxia and acceleration stresses on enzyme activities in erythrocytes and blood plasma [DLR-FB-72-71] N73-16070
- ENZYMOLOGY**
- Proton magnetic resonance spectra and calorimetry of interactions between ions, inhibitors, and substrates with two ribonucleases [BMVG-FBWT-72-7] N73-16071
 - Enthalpy values for reaction of retarding mononucleotides with ribonuclease and thermodynamic parameters for enzyme inhibitor interactions [PMVG-FBWT-72-12] N73-16073
 - Proton magnetic resonance spectra of ribonuclease & inhibitor complexes, noting effect on catalytic activity [BMVG-FBWT-72-13] N73-16074

EPIDERMIS**SUBJECT INDEX**

EPIDERMIS	Mitotic activity in dorsal epidermis of Rana pipiens.	A73-20456
EPINEPHRINE	Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress.	A73-19644
	Cardiovascular effects of fluorocarbon exposure, emphasizing epinephrine sensitivity [AD-751427]	N73-16091
EPITHELIUM	Modified rhodopsin in the pigment epithelium.	A73-20263
ERROR ANALYSIS	Heuristic response strategies and operator performance errors as function of practice in cross coupled pursuit tracking control tasks	A73-19548
ERRORS	Clinical practice and problems associated with urine analysis	N73-17089
ETHYLENE	Toxicity of pyrolysis products from chlorotrifluoroethylene-ethylene copolymer Halar resin [AD-751436]	N73-16080
EVACUATING (TRANSPORTATION)	Evaporation rates and toxic plume dispersion for defining downwind evacuation areas for populations adjacent to accidental propellant spills on shipping routes [NASA-TM-X-68188]	N73-16097
	Computerized simulation of passenger emergency evacuation efficiency using Boeing 720 aircraft models [FAA-AM-72-30]	N73-17119
EXERCISE (PHYSIOLOGY)	Physiological effects of high mountain alpinism exercises on human body	N73-16058
EXHAUST SYSTEMS	Design and performance of exhaust hood with protective air current outside of hood surface	N73-17063
EXOBIOLOGY	Survival of micro-organisms on the moon.	A73-19111
	Research and development related to space biology and medicine [JPBS-58010]	N73-16041
EXPERIMENTAL DESIGN	Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning	A73-19648
EXPIRED AIR	A model for the elastic properties of the lung and their effect on expiratory flow.	A73-21502
EXTRATERRESTRIAL LIFE	Survival of micro-organisms on the moon.	A73-19111
EYE (ANATOMY)	Electrical stimulation effects of human eye on photic threshold for square wave vision as function of wavelength, orientation and spatial frequency	A73-20260
	Meridional amblyopia - Evidence for modification of the human visual system by early visual experience.	A73-21562
EYE MOVEMENTS	Linearity of the horizontal component of the electro-oculogram.	A73-19125
	Two dimensional eye movement recording using a photo-electric matrix method.	A73-20259
	Saccadic suppression for structured background as function of visual image pattern and threshold detection elevation in central nervous system	A73-20267
EYE PROTECTION	Central nervous system stresses effects estimation, discussing ocular positioning movements functional significance and psychological processes	A73-21542
	Plastic materials for eye protection from lasers [AD-752594]	N73-17127
		F
FACE (ANATOMY)	Color photographic system using grid projector and telecentric lenses for recording contours of human face for aircrew oxygen mask fitting [RAE-TR-71184]	N73-16099
FAIL-SAFE SYSTEMS	Modulated light transmission for electrical isolation in a multichannel physiological monitoring system.	A73-19482
FATTY ACIDS	Spin-labeling studies on the membrane of a facultative thermophilic bacillus.	A73-20027
	Effect of low temperature on metabolism of rat liver slices and epididymal fat pads.	A73-20170
FEASIBILITY ANALYSIS	Feasibility of effective exercise and health evaluation and enhancement program for NASA employees	N73-17091
FEVER	Fever generation in rabbits by intravenous injection of table salt [NASA-TT-F-14677]	N73-16063
FIRE EXTINGUISHERS	Effects of chemical fire extinguishing agents containing bromotrifluoromethane on cardiovascular and nervous systems of dogs, monkeys, and baboons [AGARD-R-599]	N73-17106
FLASH	Dynamic properties of vision. III - Twin flashes, single flashes and flickerfusion.	A73-20253
FLIGHT CREWS	Renal lithiasis among civil operating aircrew	A73-21536
	Renal lithiasis among military operating aircrew	A73-21537
	Proteinuria and civil aviation aircrew	A73-21538
	Proteinuria and military aircrew	A73-21539
	Test evaluation of laser protective visors for flight crews [AD-751470]	N73-16102
	Noise effects on hearing conservation in aircrew and ground support personnel of aerospace operations	N73-17101
FLIGHT FITNESS	Renal lithiasis among military operating aircrew	A73-21537
	Proteinuria and military aircrew	A73-21539
	Antidiabetic medications and aircrew	A73-21541
FLIGHT SIMULATORS	Pilot performance during simulated standard instrument procedure turn with and without predictor display [NASA-TM-X-62201]	N73-17118
FLIGHT STRESS (BIOLOGY)	Russian book - Tissue, oxygen in the presence of extremal flight factors.	A73-19425
FLOW MEASUREMENT	Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute	A73-21325
FLOW VISUALIZATION	Pattern of blood flow within the heart - A stable system.	A73-21214

SUBJECT INDEX

HEALTH

FLOWMETERS

Thermal flowmeter for urine volume measurement in
manned space flight environment
[NASA-CR-128726] N73-16095

FLUORESCENCE

Application of the method of polarizational
ultraviolet fluorescence microscopy to study
giant muscle fibers *Balanus rostratus* Hock
A73-21135

FLUOROCARBONS

Toxicology of some commercial fluorocarbons
[AD-751429] N73-16079
Effects of chemical fire extinguishing agents
containing bromotrifluoromethane on
cardiovascular and nervous systems of dogs,
monkeys, and baboons
[AGAR-B-599] N73-17106

FLUOROHYDROCARBONS

Sensory receptors irritation and cardiopulmonary
toxicity from fluorocarbon propellants
[AD-751426] N73-16089
Cardiac toxicity of fluoroalkane gases for
propelling aerosols in industry and household
applications
[AD-751425] N73-16090
Cardiovascular effects of fluorocarbon exposure,
emphasizing epinephrine sensitivity
[AD-751427] N73-16091

FOOD INTAKE

Thermal factor and dehydration influences on
protidic and lipidic catabolisms of young men
with partial food deprivation in hot climate,
discussing metabolic balances
A73-21248

FOVEA

Intrinsic light brightness and intensity
estimation tests for foveal and peripheral
retina under photopic and scotopic stimuli
A73-20257

FREEON

Cardiac toxicity of fluoroalkane gases for
propelling aerosols in industry and household
applications
[AD-751425] N73-16090

FREQUENCY RESPONSE

Application of the numerical study of random time
series to the analysis of the
electroencephalogram of the normal infant
A73-21540

Analysis of transient visual sensations above the
flicker fusion frequency.
A73-21566

G

GAMMA RAYS

Morphological changes in the testicles of dogs
exposed to chronic and combined gamma-radiation
A73-20981

Morphological changes in testes and
spermatogenesis process of dogs subjected to
chronic and combined gamma irradiation
N73-16048

GAS EXCHANGE

A model of time-varying gas exchange in the human
lung during a respiratory cycle at rest.
A73-21615

GAS VISCOSITY

Heated Fleisch pneumotachometer - A calibration
procedure.
A73-21509

GASEOUS DIFFUSION

Significance of the Bohr and Haldane effects in
the pulmonary capillary.
A73-21614

GASTROINTESTINAL SYSTEM

Physiology of depressed metabolic states and
gastrointestinal responses to ionizing radiation
[NASA-CR-130381] N73-16038

GLOMERULUS

Morphological changes in the juxtaglomerular
apparatus of rat kidneys exposed to the action
of diversely directed accelerations for many hours
A73-20978

Morphological changes in juxtaglomerular apparatus
in kidneys of rats during multihour exposure to
accelerations in different directions
N73-16045

GLOVES

Development of prototype high pressure space suit
glove assembly
[NASA-CR-114535] N73-17120

GLUCOSE

Effects of monomethylhydrazine on blood and
cerebrospinal fluid glucose in anesthetized
monkeys
[AD-751232] N73-16092

GLUCOSIDES

Transglucosidase activity of heart-muscle
per-glucohydrolase
A73-21136

GLYCOLYSIS

The use of glycolytic metabolism in the assessment
of hypoxia in human hearts.
A73-19929

GOOGLES

Plastic materials for eye protection from lasers
[AD-752594] N73-17127

ГОWADS

Relation between the frequency-amplitude
characteristics of cerebral electrical activity
and gonadotropin hormone excretion levels at
various stages of ontogenesis
A73-21319

GRAVITATIONAL EFFECTS

Renal component of antigravitational function in
body
N73-16043

GROUND CREWS

Noise effects on hearing conservation in aircrew
and ground support personnel of aerospace
operations
N73-17101

GROUND SUPPORT SYSTEMS

Evaluation of device to train forward air
controllers to communicate target locations
[AD-751292] N73-16103

GUINEA PIGS

Guinea pigs used to determine effect of
intramuscular injections of drugs on fall-out
and Bekhterev nyctagmus occurring after
unilateral and bilateral labyrinthectomies
N73-16049

Pharmacologic investigations of antagonistic
effects of pyridines on isolated guinea pig ileum
[BMVG-PBWT-72-14] N73-16075

H

HABITABILITY

Recorded observations of crew member activities
during Tektite 2 underwater habitability study
[NASA-CR-130034] N73-16094

Habitability factors during long-term space and
undersea missions in confined habitats
[NASA-CR-130537] N73-17123

HABITATS

Multispectral remote sensing techniques applied to
study changes in wildlife habitats
N73-16396

HALOGEN COMPOUNDS

Hepatotoxic effects of dichloromethane inhalation
in mice
[AD-751434] N73-16081

HALOPHILES

Studies on acid production during carbohydrate
metabolism by extremely halophilic bacteria.
A73-19500

HAND (ANATOMY)

Study of differences between left and right hand
performance in compensatory tracking task
[RAE-TR-72117] N73-16098

HEAD MOVEMENT

Observations on perceived changes in aircraft
attitude attending head movements made in a 2-g
bank and turn.
A73-19485

HEALTH

Industrial model for leave and overtime taking
behavior of employees exposed to peak work
activity periods in relation to health,
demography, and job variables
N73-17055

Conference on occupational and environmental
medical services provided to NASA employees
[NASA-TM-X-69074] N73-17078

HEALTH PHYSICS

SUBJECT INDEX

Management of NASA employee health problems by automated medical system N73-17079
 Chronic disease health trends and mortality rates in employee population of NASA Goddard Space Flight Center N73-17086
 Feasibility of effective exercise and health evaluation and enhancement program for NASA employees N73-17091
 Medical services of operating environmental health program for industrial workers N73-17093

HEALTH PHYSICS

Remote sensing techniques for detection and prevention of Rocky Mountain spotted fever, Encephalitis, Malaria, and Red Tide environmental health problems [NASA-CR-128727] N73-16060
 Abstracts on radiation and health physics [BNWL-1651-VOL-2-PT-2] N73-16069
 Public health exposure limits to nitrogen oxide, hydrogen chloride, and hydrogen fluoride air pollutants [AD-751438] N73-16084
 Public health exposure limits for air pollutants [AD-751437] N73-16088
 Cardiac toxicity of fluoralkane gases for propelling aerosols in industry and household applications [AD-751425] N73-16090
 Multiphase health screening and medical history questionnaire for preventive/occupational physical examinations N73-17052
 Medical concepts and functional management in NASA Environmental Health Program N73-17056
 Physical exercise effects on health of NASA personnel N73-17069
 Industrial health measures and environmental control to insure worker productivity N73-17077
 Effects of chemical fire extinguishing agents containing bromotrifluoromethane on cardiovascular and nervous systems of dogs, monkeys, and baboons [AGARD-R-599] N73-17106
 Survey of industrial hygiene and safety in Air Forces operations [AD-751897] N73-17126

HEARING

Noise effects on hearing conservation in aircrew and ground support personnel of aerospace operations N73-17101

HEART DISEASES

Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches. A73-19152
 Assessment of hypoxia in the human heart. A73-19928
 The use of glycolytic metabolism in the assessment of hypoxia in human hearts. A73-19929
 Sinus venosus atrial septal defect - Analysis of fifty cases. A73-20368
 Inability of the submaximal treadmill stress test to predict the location of coronary disease. A73-21802
 Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects. A73-21803
 Ventriculographic patterns and hemodynamics in primary myocardial disease. A73-21804
 Relation of electrolyte disturbances to cardiac arrhythmias. A73-21807
 Physical exercise and physical fitness program for preventing and treating human coronary heart disease N73-17051

Personality, occupation, and job stress effects on physiological risk factor in human coronary heart disease N73-17054
 Dynamic electrocardiography in periodic health examinations for detection of cardiac abnormalities N73-17065
 Dynamic electrocardiographic standardization for detecting cardiac risk factor in personnel N73-17066
 Physical exercise effects on health of NASA personnel N73-17069
 Continuous monitoring of hypertension and hypercholesterolemia in NASA employees for prevention of heart disease and disability N73-17072
 Blood lipid diagnostic and therapeutic measures to prevent heart disease in humans N73-17073
 Blood pressure and cholesterol level screening for preventing heart diseases in flight crews of commercial airline N73-17076
 Risk scoring system for identifying subjects with high risk to coronary heart disease N73-17080
 Electrocardiographic stress testing for determining influence of occupational and other stresses on ischemic heart disease N73-17082
 Clinical analysis of relationship between VFB and mortality rate in patient with acute myocardial infarctions N73-17083
 Precorony care and sudden death prevention due to coronary disease in industrial workers N73-17084

HEART FUNCTION

The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms. A73-19124
 Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151
 Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648
 The contractile function of the myocardium in two types of cardiac adaptation to a chronic load. A73-19931
 Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169
 A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man. A73-20369
 A model to predict respiration from VCG measurements. A73-20578
 Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015
 Transglucosidase activity of heart-muscle per-glucohydrolase A73-21136
 Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215
 Analysis of indicator distribution in the determination of cardiac output by thermal dilution. A73-21216
 Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter. A73-21217
 Left ventricular performance after myocardial infarction assessed by radioisotope angiography. A73-21801

SUBJECT INDEX

HUMAN FACTORS ENGINEERING

- Order and disorder in the rhythm of the heart
 /Fifth Annual George C. Griffith Lecture/. A73-21806
- HEART RATE**
 Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise A73-20034
- Method for measuring the contractions of small hearts in organ culture. A73-21218
- Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/. A73-21806
- Changes in electrocardiographs of Rhesus monkeys as function of age [NASA-TT-F-14675] N73-16062
- Long term exercise effects on cardiovascular response in NASA personnel with periodic ergonomic evaluation N73-17067
- Clinical analysis of relationship between VTB and mortality rate in patient with acute myocardial infarctions N73-17083
- HEART VALVES**
 Case histories of valvular cardiopathies in military pilots, determining tolerance to flight A73-19209
- HEAT MEASUREMENT**
 Proton magnetic resonance spectra and calorimetry of interactions between ions, inhibitors, and substrates with two ribonucleases [BBVG-FBWT-72-7] N73-16071
- HELIUM**
 Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere A73-20979
- HEMATOPOIETIC SYSTEM**
 Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress A73-19644
- HEMODYNAMIC RESPONSES**
 The contractile function of the myocardium in two types of cardiac adaptation to a chronic load. A73-19931
- Time course of pulmonary vascular response to hypoxia in dogs. A73-20168
- A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man. A73-20369
- Analysis of some mechanisms of human stability to decompression of the lower portion of the body A73-20987
- Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015
- Cardiovascular changes in middle-aged men during two years of training. A73-21504
- HEMODYNAMICS**
 Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
- Ventriculographic patterns and hemodynamics in primary myocardial disease. A73-21804
- HEMOGLOBIN**
 Stochastic model application to divergence of horse-pig lineage from common ancestor in terms of hemoglobin and fibrinopeptides alpha and beta chains A73-19218
- HEPARINS**
 Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current A73-21321
- HEURISTIC METHODS**
 Heuristic response strategies and operator performance errors as function of practice in cross coupled pursuit tracking control tasks A73-19588
- HIBERNATION**
 Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms. A73-21612
- Pulmonary respiration and acid-base state in hibernating marmots and hamsters. A73-21613
- HIGH ALTITUDE ENVIRONMENTS**
 High altitude acclimatization and mountain climbing effects on human organism, considering oculomotor, cardiovascular and respiratory responses and endurance A73-20991
- HIGH ALTITUDE TESTS**
 Coding data of 2565 individual human altitude chamber tests [NASA-CR-114550] N73-16066
- HIGH PRESSURE**
 Development of prototype high pressure space suit glove assembly [NASA-CR-114535] N73-17120
- HIPPOCAMPUS**
 Rabbit hippocampal neuron activity relation to theta-wave phases from cell potential and extracellular recording analyses A73-20005
- HISTOLOGY**
 Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation A73-20981
- Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215
- HOMEOSTASIS**
 Ergatic organism defined as multipurpose nonautonomous control system with homeostasis with respect to functional operations conservation A73-20048
- HORMONE METABOLISM**
 Human endocrine-metabolic responses to graded oxygen pressures. A73-19479
- Catecholamine exchange in the hormonal and mediator links of the sympathicoadrenal system under stress A73-20367
- Renal component of the antigravitation function of the organism A73-20976
- Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotrophic hormone excretion levels at various stages of ontogenesis A73-21319
- Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. A73-21503
- HUMAN BEHAVIOR**
 Industrial model for leave and overtime taking behavior of employees exposed to peak work activity periods in relation to health, demography, and job variables N73-17055
- HUMAN BEINGS**
 Biophysical mechanisms of noninvasive measurement of CVP in man [NASA-CR-130348] N73-16039
- Correlation of physical activity and oxygen consumption between man and mouse [POA-1-B-1233-A5] N73-17108
- HUMAN BODY**
 Human tendon stress recovery after load removal as function of time, sex, age and side differences A73-20033
- Accelerometers, electromyogram sensors, and telemetry system for measuring human body segment motions: [AD-751134] A73-16104
- Stabilization methods in collecting and shipping of human sera for chemical analyses N73-17053
- Influence of infrasound on human body functions N73-17085
- HUMAN FACTORS ENGINEERING**
 Measurement and effects of triaxial vibration on pilots in P-531 (Scout) helicopter under different flight conditions [ISVR-TB-58] N73-16100

HUMAN PATHOLOGY

Electronic detectors and computer software for analyzing human electroencephalographs in isolated environment [AD-751272] N73-16105
 Conceptual model for pilot workload N73-17010
 Conference on occupational medicine support in NASA programs to prevent health and emotional problems in personnel [NASA-TM-X-69072] N73-17048
 Physical exercise and physical fitness program for preventing and treating human coronary heart disease N73-17051

Problems of environmental pollution and natural resource depletion caused by man [JPRS-58113] N73-17121
 Habitability factors during long-term space and undersea missions in confined habitats [NASA-CR-130537] N73-17123

HUMAN PATHOLOGY

Industrial health hazard in chronic exposure to monomethylhydrazine and dose related hemolytic anemia in humans [AD-751440] N73-16087
 Blood lipid diagnostic and therapeutic measures to prevent heart disease in humans N73-17073
 Periodic health examinations and automatic processing of medical histories for detection and prevention of human diseases N73-17074
 Blood pressure and cholesterol level screening for preventing heart diseases in flight crews of commercial airline N73-17076

HUMAN PERFORMANCE

German monograph - The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials. A73-20389
 German monograph - Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram. A73-20391
 High altitude acclimatization and mountain climbing effects on human organism, considering oculomotor, cardiovascular and respiratory responses and endurance A73-20991
 Meridional amblyopia - Evidence for modification of the human visual system by early visual experience. A73-21562

Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem A73-21575

Diurnal dynamics of psychic performance during 72-hour continuous wakefulness N73-16056

Study of differences between left and right hand performance in compensatory tracking task [RAE-TR-72117] N73-16098

Mental health services for emotional counselling in NASA facilities to insure maximum human performance N73-17062

Industrial health measures and environmental control to insure worker productivity N73-17077

Noise effects on hearing conservation in aircrew and ground support personnel of aerospace operations N73-17101

Standardized performance battery for assessing effects of environmental stressors particularly noise on human performance [NASA-CR-2149] N73-17102

German monograph - Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modularity. A73-20388

SUBJECT INDEX

Coding data of 2565 individual human altitude chamber tests [NASA-CR-114550] N73-16066

Recorded observations of crew member activities during Tektite 2 underwater habitability study [NASA-CR-130034] N73-16094

Long term exercise effects on cardiovascular response in NASA personnel with periodic ergonomic evaluation N73-17067

Structural vibrations in aerospace operations and effects on man N73-17099

Choice reaction tasks for discriminating individual skill potentials in information handling situations [AD-752073] N73-17115

HUMAN TOLERANCES

Case histories of valvular cardiopathies in military pilots, determining tolerance to flight A73-19209

Mountain inhabitants physiological characteristics due to altitude effects, investigating human tolerance and adaptation to ambient environment A73-19212

Analysis of some mechanisms of human stability to decompression of the lower portion of the body A73-20987

Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability A73-20988

Analysis of mechanisms of human tolerance to lower body decompression N73-16054

Personality, occupation, and job stress effects on physiological risk factor in human coronary heart disease N73-17054

Toxicity and safety hazard of dry beryllium copper alloy machining for human operator N73-17059

Structural vibration and noise effects on man in aerospace operations [AGARDOGRAPH-151] N73-17098

Structural vibrations in aerospace operations and effects on man N73-17099

Airborne noise in aerospace operations and bioacoustics effects on man N73-17100

HUMAN WASTES

Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984

Radiation oxidation of water impurities in moisture-containing products of human vital functions N73-16051

HYDROFLUORIC ACID

Public health exposure limits to nitrogen oxide, hydrogen chloride, and hydrogen fluoride air pollutants [AD-751438] N73-16084

HYDROGEN

Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria. A73-21685

HYDROGEN CHLORIDES

Public health exposure limits to nitrogen oxide, hydrogen chloride, and hydrogen fluoride air pollutants [AD-751438] N73-16084

HYDROLYSIS

Transglucosidase activity of heart-muscle; per-glucohydrolase A73-21136

HYGIENE

Industrial hygiene, radiological health, and spacecraft sanitation studies in NASA Environmental Health Program N73-17057

Survey of industrial hygiene and safety in Air Forces operations [AD-751897] N73-17126

SUBJECT INDEX

INSULIN

HYOSCINE

Effect of some pharmacological preparations on the fall-out nystagmus and Bechterew nystagmus A73-20982

HYPERCAPNIA

Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability A73-20988

Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322

HYPEROXIA

Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria. A73-19483

Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability A73-20988

Effects of an hyperoxic hypobaric environment on renin-aldoesterone in normal man. A73-21503

HYPERTENSION

Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015

HYPOBARIC ATMOSPHERES

Effects of an hyperoxic hypobaric environment on renin-aldoesterone in normal man. A73-21503

Central, femoral, and brachial circulation during exercise in hypoxia. A73-21506

HYPODYANIA

Biological effects of lasting hypodynamia on young albino rats in 62 day confinement, considering weight, growth and sexual behavior A73-20983

Effect of prolonged hypodynamia on rat biology N73-16050

HYPOGLYCEMIA

Antidiabetic medications and aircrew A73-21541

HYPOKINESIA

Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia A73-20985

HYPOTHALAMUS

The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies A73-19647

HYPOTHERMIA

Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169

Effect of low temperature on metabolism of rat liver slices and epididymal fat pads. A73-20170

HYPOXIA

Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151

Russian book - Tissue, oxygen in the presence of extremal flight factors. A73-19425

Inhibition of the adrenocortical response to hypoxia by dexamethasone. A73-19476

Assessment of hypoxia in the human heart. A73-19928

The use of glycolytic metabolism in the assessment of hypoxia in human hearts. A73-19929

Time course of pulmonary vascular response to hypoxia in dogs. A73-20168

Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169

Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere A73-20979

Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia

A73-21322

Central, femoral, and brachial circulation during exercise in hypoxia. A73-21506

Thermoregulation reactions of rats in hypoxic atmosphere with nitrogen and helium dilution N73-16046

Effects of hypoxia and acceleration stresses on enzyme activities in erythrocytes and blood plasma [DLR-FB-72-71] N73-16070

IDENTIFYING

Differential light scattering patterns for identifying different species of bacteria N73-17090

IMAGE CONTRAST

Vernier alignment acuity task accuracy related to retinal image line position location, noting effect of high contrast grating background A73-20159

Random dot pattern luminance and contrast effects on limiting inter-stimulus interval for visual apparent motion masking by bright field A73-20256

Contrast and assimilation effects analysis based on receptive field models of vertebrate retinal function A73-20812

IMAGE TUBES

An instrument panel on an image tube in color A73-21543

IMMUNOLOGY

The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies A73-19647

Automated procedures for Passive Immune Agglutination system [NASA-CR-128731] N73-17107

IMPLANTATION

An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510

INDUSTRIAL MANAGEMENT

Precorony care and sudden death prevention due to coronary disease in industrial workers N73-17084

INDUSTRIAL PLANTS

Industrial model for leave and overtime taking behavior of employees exposed to peak work activity periods in relation to health, demography, and job variables N73-17055

INDUSTRIAL SAFETY

Survey of industrial hygiene and safety in Air Forces operations [AD-751897] N73-17126

INDUSTRIES

Industrial health measures and environmental control to insure worker productivity N73-17077

Medical services of operating environmental health program for industrial workers N73-17093

INFRASONIC FREQUENCIES

Influence of infrasound on human body functions N73-17085

INHIBITORS

Photosensitized inhibitor formation in isolated, aging chloroplasts. A73-20453

INOCULATION

Automatic inoculating device for agar trays using cotton swab or loop [NASA-CASE-LAB-11074-1] N73-16096

INSTRUMENT COMPENSATION

Heated Fleisch pneumotachometer - A calibration procedure. A73-21509

INSULIN

Antidiabetic medications and aircrew A73-21541

INTESTINES

SUBJECT INDEX

INTESTINES

Pharmacologic investigations of antagonistic effects of pyridines on isolated guinea pig ileum [BMVG-PBWT-72-14] N73-16075

INTRAVENOUS PROCEDURES

Analysis of indicator distribution in the determination of cardiac output by thermal dilution. A73-21216
Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter. A73-21217

ION EXCHANGE MEMBRANE ELECTROLYTES

Relation of electrolyte disturbances to cardiac arrhythmias. A73-21807

IONIZING RADIATION

Physiology of depressed metabolic states and gastrointestinal responses to ionizing radiation [NASA-CR-130381] N73-16038

IRRADIATION

Radiation oxidation of water impurities in moisture-containing products of human vital functions N73-16051

ISCHEMIA

Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151

Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches. A73-19152

Assessment of hypoxia in the human heart. A73-19928

The use of glycolytic metabolism in the assessment of hypoxia in human hearts. A73-19929

ISOTOPIC LABELING

Effect of accelerations on the thiamine-S/35/ distribution in the organism of white mice A73-20977

K

KETONES

Methylisobutylketone causing lesions in first and second sections of proximal convoluted tubule of nephron of kidney [AD-751444] N73-16083

KIDNEY DISSECS

Methylisobutylketone causing lesions in first and second sections of proximal convoluted tubule of nephron of kidney [AD-751444] N73-16083

KIDNEYS

Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours A73-20978

Morphological changes in juxtaglomerular apparatus in kidneys of rats during multihour exposure to accelerations in different directions N73-16045

L

LABYRINTHECTOMY

Effect of some pharmacological preparations on the fall-out nystagmus and Bechterev nystagmus A73-20982

Guinea pigs used to determine effect of intramuscular injections of drugs on fall-out and Bechterev nystagmus occurring after unilateral and bilateral labyrinthectomies N73-16049

LASERS

Test evaluation of laser protective visors for flight crews [AD-751470] N73-16102

Plastic materials for eye protection from lasers [AD-752594] N73-17127

LEAD (METAL)

X ray fluorescence analysis for determining lead content of paint on pencils in Goddard supply system N73-17097

LEARNING MACHINES

Automaton synthesis and perceptron learning for controlled objects classification according to unknown features, noting adaptive relationships between retina and associative elements A73-20047

LEAVES

Reflectance, transmittance and absorbance spectra of normal and six types of maize leaves [NASA-CR-130032] N73-16065

LEG (ANATOMY)

The interaction between muscle groups in a complex motor act in humans A73-21320

LESIONS

Cerebral localization of speech, discussing cortical lesions, aphasia and mental activity correlation theories A73-21425

Methylisobutylketone causing lesions in first and second sections of proximal convoluted tubule of nephron of kidney [AD-751444] N73-16083

LIFE SUPPORT SYSTEMS

Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984

LIGHT ADAPTION

Intrinsic light brightness and intensity estimation tests for foveal and peripheral retina under photopic and scotopic stimuli A73-20257

Neural channel mechanism for real light and equivalent background coding, using test flashes under bleaching and field adaptation A73-20258

Mitotic activity in dorsal epidermis of Rana pipiens. A73-20456

LIGHT MODULATION

On the approximation of the optical modulation transfer function /MTF/ by analytical functions. A73-20264

LIGHT SCATTERING

Differential light scattering patterns for identifying different species of bacteria N73-17090

LIPID METABOLISM

Diurnal rhythm oscillations of fat metabolism indices in healthy young men A73-19646

Thermal factor and dehydration influences on protidic and lipidic catabolisms of young men with partial food deprivation in hot climate, discussing metabolic balances A73-21248

LIPIDS

Blood lipid diagnostic and therapeutic measures to prevent heart disease in humans N73-17073

LIPOPROTEINS

Blood lipid diagnostic and therapeutic measures to prevent heart disease in humans N73-17073

LITHIASIS

Renal lithiasis among civil operating aircrew A73-21536

Renal lithiasis among military operating aircrew A73-21537

LIVER

Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169

Effect of low temperature on metabolism of rat liver slices and epididymal fat pads. A73-20170

Hepatotoxic effects of dichloromethane inhalation in mice [AD-751434] N73-16081

LOCOMOTION

Accelerometers, electromyogram sensors, and telemetry system for measuring human body segment motions [AD-751134] N73-16104

SUBJECT INDEX

MENTAL HEALTH

LOGIC CIRCUITS		
Stability behavior of adapting and untrained random logic nets, enabling intelligent interaction with environment	A73-20400	
LUMINANCE		
Random dot pattern luminance and contrast effects on limiting inter-stimulus interval for visual apparent motion masking by bright field	A73-20256	A73-21875
The brightness of coloured flashes on backgrounds of various colours and luminances.	A73-21565	A73-21502
Visual sensitivity in the presence of alternating monochromatic fields of light.	A73-21567	
LUMINOUS INTENSITY		
Evoked potential correlates of expected stimulus intensity.	A73-21225	A73-19482
LUNAR ENVIRONMENT		
Survival of micro-organisms on the moon.	A73-19111	A73-21218
LUNAR RECEIVING LABORATORY		
Occupational medicine procedures for personnel in lunar receiving laboratory for Apollo 11 crew members	N73-17049	N73-16093
LUNGS		
Predictions of the dynamic response of the lung.	A73-19477	
Effects of lung volume and disease on the lung nitrogen decay curve.	A73-21501	
A model for the elastic properties of the lung and their effect on expiratory flow.	A73-21502	
A model of time-varying gas exchange in the human lung during a respiratory cycle at rest.	A73-21615	
LYMPHOCYTES		
The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture	A73-19649	N73-17049
M		
MACHINING		
Toxicity and safety hazard of dry beryllium copper alloy machining for human operator	N73-17059	
MAN MACHINE SYSTEMS		
German monograph - Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modulability.	A73-20388	
MANNED SPACE FLIGHT		
Indices of emotional stress in cosmonauts during Voskhod 2 and Soyuz flights [JPRS-58039]	N73-17104	
Habitability factors during long-term space and undersea missions in confined habitats [NASA-CR-130537]	N73-17123	
MANNED SPACECRAFT		
Current status of models for the human operator as a controller and decision maker in manned aerospace systems.	A73-20587	
MANUAL CONTROL		
Heuristic response strategies and operator performance errors as function of practice in cross coupled pursuit tracking control tasks	A73-19548	
MATERIALS HANDLING		
Stabilization methods in collecting and shipping of human sera for chemical analyses	B73-17053	
MATHEMATICAL MODELS		
Stochastic model application to divergence of horse-pig lineage from common ancestor in terms of hemoglobin and fibrinopeptides alpha and beta chains	A73-19218	
Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning	A73-19648	
MEMBRANES		
Synthesis of reverse osmosis membranes by plasma polymerization of allylamine.	A73-19169	
Spin-labeling studies on the membrane of a facultative thermophilic bacillus.	A73-20027	
MENTAL HEALTH		
Mental health services for emotional counselling in NASA facilities to insure maximum human performance	N73-17062	
Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073]	N73-17064	

MENTAL PERFORMANCE

SUBJECT INDEX

MENTAL PERFORMANCE

- German monograph - Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modularity. A73-20388
- Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness A73-20989
- Cerebral localization of speech, discussing cortical lesions, aphasia and mental activity correlation theories A73-21425
- METABOLISM**
- Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169
- Effect of accelerations on the thiamine-S/35 distribution in the organism of white mice A73-20977
- Physiology of depressed metabolic states and gastrointestinal responses to ionizing radiation [NASA-CR-130381] N73-16038
- Effect of accelerations on thiamine S-35 distribution in organs, tissues, and subcellular structures of white mice N73-16044
- METHANE**
- Hepatotoxic effects of dichloromethane inhalation in mice [AD-751434] N73-16081
- Effects of chemical fire extinguishing agents containing bromotrifluoromethane on cardiovascular and nervous systems of dogs, monkeys, and baboons [AGARD-R-599] N73-17106
- METHYL CHLORIDE**
- Effects of continuous methylene chloride exposure on spontaneous activity of mice for two weeks [AD-751435] N73-16082
- METHYLDIHYDRAZINE**
- Animal species susceptibility to toxic effects of long term exposure to environmental monomethylhydrazine [AD-751441] N73-16086
- Industrial health hazard in chronic exposure to monomethylhydrazine and dose related hemolytic anemia in humans [AD-751440] N73-16087
- Effects of monomethylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232] N73-16092
- MICE**
- Effect of accelerations on thiamine S-35 distribution in organs, tissues, and subcellular structures of white mice N73-16044
- Mortality and blood cell count variation in mice after irradiation with fast neutrons and X rays [BMVG-FEW-72-16] N73-16077
- Hepatotoxic effects of dichloromethane inhalation in mice [AD-751434] N73-16081
- Effects of continuous methylene chloride exposure on spontaneous activity of mice for two weeks [AD-751435] N73-16082
- Correlation of physical activity and oxygen consumption between man and mouse [FOA-1-B-1233-A5] N73-17108
- MICROBIOLOGY**
- Cinemicrographic study of the development of subsurface colonies of *Staphylococcus aureus* in soft agar. A73-21828
- Automatic swabbing apparatus for sampling of microbiological surfaces [NASA-CASE-LAR-11069-1] N73-16061
- Automatic inoculating device for agar trays using cotton swab or loop [NASA-CASE-LAR-11074-1] N73-16096
- Analysis of standards and procedures for planetary quarantine with emphasis on determination of mission specifications [NASA-CR-130558] N73-17103
- Microbiological assay procedures for spacecraft cabling, antennas, solar panels, and thermal blankets [NASA-CR-130383] N73-17109

MICROCLIMATOLOGY

- Thermal protective garment using independent regional control of coolant temperature. A73-19481

MICROORGANISMS

- Survival of micro-organisms on the moon. A73-19111
- Soil sampling and microorganism analysis in planetary spacecraft assembly area for prevention of Mars contamination [NASA-CR-130009] N73-16059
- Automatic swabbing apparatus for sampling of microbiological surfaces [NASA-CASE-LAR-11069-1] N73-16061

MICROSTRUCTURE

- Application of the method of polarization ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Rock A73-21135

MILITARY AVIATION

- Case histories of valvular cardiopathies in military pilots, determining tolerance to flight A73-19209

Proteinuria and military aircrew

A73-21539

MITOSIS

- The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture A73-19649
- Mitotic activity in dorsal epidermis of *Rana pipiens*. A73-20456

MOLECULAR BIOLOGY

- Ribosomal RNA base composition and molecular evolution in plants and animals of various taxonomic groups A73-19220

MONKEYS

- Changes in electrocardiographs of Rhesus monkeys as function of age [NASA-TT-P-14675] N73-16062

MONOCHROMATIC RADIATION

- Visual sensitivity in the presence of alternating monochromatic fields of light. A73-21567

MONOCULAR VISION

- Threshold variance analysis of monocular vs binocular visual stimulation in apparent movement perception A73-20262

MORTALITY

- Clinical analysis of relationship between VPD and mortality rate in patient with acute myocardial infarctions N73-17083

- Precorony care and sudden death prevention due to coronary disease in industrial workers N73-17084

- Chronic disease health trends and mortality rates in employee population of NASA Goddard Space Flight Center N73-17086

MOTION SICKNESS

- Guinea pigs used to determine effect of intramuscular injections of drugs on fall-out and Bekhterev nystagmus occurring after unilateral and bilateral labyrinthectomies N73-16049

MOTION SICKNESS DRUGS

- Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990

- Effectiveness of sodium hydrocarbonate as means for treating and preventing motion sickness N73-16057

MOUNTAIN INHABITANTS

- Mountain inhabitants physiological characteristics due to altitude effects, investigating human tolerance and adaptation to ambient environment A73-19212

MOUNTAINS

- Physiological effects of high mountain alpinism exercises on human body N73-16058

MULTISPECTRAL PHOTOGRAPHY

- Multispectral remote sensing techniques for identification of corn blight disease [NASA-TM-X-69055] N73-16064

SUBJECT INDEX

NEURAL NETS

- Multispectral remote sensing techniques applied to study changes in wildlife habitats N73-16396
- BIVARIATE STATISTICAL ANALYSIS**
- Multivariate limits for describing cockpit related anthropometric features of aviation personnel [AD-752032] N73-17124
- MUSCLES**
- Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Rock A73-21135
- Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- MUSCULAR FATIGUE**
- Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress A73-19643
- MUSCULAR FUNCTION**
- Adenonucleotides, NAD+, and NADH in skeletal muscles during intensive work and at rest A73-19475
- Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress A73-19643
- A method for chronocyclographical motion analysis with the aid of an on-line computer A73-20036
- The interaction between muscle groups in a complex motor act in humans A73-21320
- Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold A73-21323
- Blood vessels simulation by muscle pump represented by elastically deformable pipe with valves, solving Navier-Stokes equation for viscous fluid flow A73-21375
- Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. A73-21505
- An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510
- MUSCULAR TONUS**
- Action of a serum protein on muscular contraction. A73-21200
- MUSCULOSKELETAL SYSTEM**
- An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510
- MUTATIONS**
- Stochastic model application to divergence of horse-pig lineage from common ancestor in terms of hemoglobin and fibrinopeptides alpha and beta chains A73-19218
- MYOCARDIAL INFARCTION**
- Left ventricular performance after myocardial infarction assessed by radioisotope angiography. A73-21801
- Intravascular platelet aggregation in the heart induced by stress. A73-21805
- Electrocardiographic stress testing for determining influence of occupational and other stresses on ischemic heart disease N73-17082
- Clinical analysis of relationship between VFB and mortality rate in patient with acute myocardial infarctions N73-17083
- MYOCARDIUM**
- Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151
- Assessment of hypoxia in the human heart. A73-19928
- The use of glycolytic metabolism in the assessment of hypoxia in human hearts. A73-19929
- The contractile function of the myocardium in two types of cardiac adaptation to a chronic load. A73-19931
- Transglucosidase activity of heart-muscle per-glucohydrolase A73-21136
- Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215
- Ventriculographic patterns and hemodynamics in primary myocardial disease. A73-21804
- Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/. A73-21806
- MYOELECTRICITY**
- Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold A73-21323
- N**
- NASA PROGRAMS**
- Conference on occupational medicine support in NASA programs to prevent health and emotional problems in personnel [NASA-TM-X-69072] N73-17048
- Medical concepts and functional management in NASA Environmental Health Program N73-17056
- Industrial hygiene, radiological health, and spacecraft sanitation studies in NASA Environmental Health Program N73-17057
- Environmental health measures to prevent cabin atmosphere toxicity and provide drinking water standards in manned space flight applications N73-17058
- Routine proctosigmoidoscopic examinations of asymptotic NASA personnel for cancer prevention N73-17061
- Mental health services for emotional counselling in NASA facilities to insure maximum human performance N73-17062
- Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073] N73-17064
- Long term exercise effects on cardiovascular response in NASA personnel with periodic ergometric evaluation N73-17067
- Computerized multivariate scheduling of physical examinations for NASA personnel in clinical intervention program N73-17068
- Physical exercise effects on health of NASA personnel N73-17069
- Continuous monitoring of hypertension and hypercholesterolemia in NASA employees for prevention of heart disease and disability N73-17072
- Conference on occupational and environmental medical services provided to NASA employees [NASA-TM-X-69074] N73-17078
- Influence of repeated test and dietary counseling on hypercholesterolemia control in NASA employees N73-17081
- Feasibility of effective exercise and health evaluation and enhancement programs for NASA employees N73-17091
- Influence of NASA stress lab program on physical education in US colleges N73-17092
- NERVOUS SYSTEM**
- Nervous system functional changes due to forces of acceleration and weightlessness [NASA-TT-P-733] N73-17105
- NEURAL NETS**
- Information processing in the visual system. A73-20374

NEUROBASIC TRANSMISSION

SUBJECT INDEX

NEUROBASIC TRANSMISSION

Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculi of the cat spinal cord A73-20002

Changes in the amplitudinal and temporal characteristics of sensosotor-cortex evoked potentials after deactivation of spinocervical tracts in cats A73-20004

Ontogenetic cerebrospinal reflex activity studies, covering spinal cord morphology, reflex arches, inhibition, intracentral responses and post-tetanic potentiation A73-20366

Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold A73-21323

Order and disorder in the rhythms of the heart /Fifth Annual George C. Griffith Lecture/ A73-21806

NEURONS

Neural channel mechanism for real light and equivalent background coding, using test flashes under bleaching and field adaptation A73-20258

NEUROPHYSIOLOGY

Electrophysiological investigation of suprasegmental motor control systems evolution through Cyclostomata-Primate series, noting preservation of reticulomotor neuron projection characteristics A73-20001

Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculi of the cat spinal cord A73-20002

Rabbit hippocampal neuron activity relation to theta-wave phases from cell potential and extracellular recording analyses A73-20005

NEUTRON IRRADIATION

Mortality and blood cell count variation in mice after irradiation with fast neutrons and X rays [BMVG-FBWT-72-16] N73-16077

NITROGEN

Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere A73-20979

Effects of lung volume and disease on the lung nitrogen decay curve. A73-21501

NITROGEN OXIDES

Public health exposure limits to nitrogen oxide, hydrogen chloride, and hydrogen fluoride air pollutants [AD-751438] N73-16084

NOISE INJURIES

Structural vibration and noise effects on man in aerospace operations [AGARDOGRAPH-151] N73-17098

Airborne noise in aerospace operations and bioacoustics effects on man N73-17100

NOISE INTENSITY

Airborne noise in aerospace operations and bioacoustics effects on man N73-17100

Standardized performance battery for assessing effects of environmental stressors particularly noise on human performance [NASA-CR-2149] N73-17102

NUCLEASE

Proton magnetic resonance spectra and calorimetry of interactions between ions, inhibitors, and substrates with two ribonucleases [BMVG-FBWT-72-7] N73-16071

Enthalpy values for reaction of retarding mononucleotides with ribonuclease and thermodynamic parameters for enzyme inhibitor interactions [PMVG-FBWT-72-12] N73-16073

Proton magnetic resonance spectra of ribonuclease A inhibitor complexes, noting effect on catalytic activity [BMVG-FBWT-72-13] N73-16074

NUCLEOGENESIS

Ribosomal RNA base composition and molecular evolution in plants and animals of various taxonomic groups

A73-19220

NYSTAGMUS

Effect of some pharmacological preparations on the fall-out nystagmus and Bechterev nystagmus

A73-20982

Guinea pigs used to determine effect of intramuscular injections of drugs on fall-out and Bekhterev nystagmus occurring after unilateral and bilateral labyrinthectomies

N73-16049

O

OCULOGRAVIC ILLUSIONS

Disorienting effects of aircraft catapult launchings.

A73-19480

OCULOMETERS

Linearity of the horizontal component of the electro-oculogram.

A73-19125

Two dimensional eye movement recording using a photo-electric matrix method.

A73-20259

Pupilometry using advanced design oculometer [AD-752121] N73-17116

ONTOGENY

Ontogenetic cerebrospinal reflex activity studies, covering spinal cord morphology, reflex arches, inhibition, intracentral responses and post-tetanic potentiation

A73-20366

Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropic hormone excretion levels at various stages of ontogenesis

A73-21319

OPERATOR PERFORMANCE

Heuristic response strategies and operator performance errors as function of practice in cross coupled pursuit tracking control tasks

A73-19548

Human operators and automatic adaptive controllers - A comparative study on a particular control task.

A73-20399

Current status of models for the human operator as a controller and decision maker in manned aerospace systems.

A73-20587

Comparison of human operator critical tracking task performance with aural and visual displays.

A73-21667

OPERATORS (PERSONNEL)

Toxicity and safety hazard of dry beryllium copper alloy machining for human operator

N73-17059

Linear rating scale for selecting tracking task parameters by subjective operator

N73-17125

OPTICAL ILLUSION

Attention field and perception probability distribution mechanisms of Muller-Lyer illusion due to angle contour

A73-20255

OPTICAL TRACKING

Autokinetic movement as a function of the implied movement of target shape.

A73-19549

Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem

A73-21575

OPTOMETRY

Two dimensional eye movement recording using a photo-electric matrix method.

A73-20259

ORGANISMS

Ergatic organism defined as multipurpose nonautonomous control system with homeostasis with respect to functional operations conservation

A73-20048

ORTHOGONALITY	
Orthogonal versus planar vector-electrocardiography.	A73-19930
CRHOTOSTATIC TOLERANCE	
' Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia	A73-20985
Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability	A73-20988
Proteinuria and civil aviation aircrew	A73-21538
Effect of atmosphere with increased oxygen and carbon dioxide content on human orthostatic tolerance following 10 days of bedrest	N73-16055
OSMOSIS	
Synthesis of reverse osmosis membranes by plasma polymerization of allylamine.	A73-19169
Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta.	A73-21199
OXIDATION	
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products	A73-20984
Radiation oxidation of water impurities in moisture-containing products of human vital functions	N73-16051
OXYGEN CONSUMPTION	
Central, femoral, and brachial circulation during exercise in hypoxia.	A73-21506
Correlation of physical activity and oxygen consumption between man and mouse [FOA-1-E-1233-A5]	N73-17108
OXYGEN MASKS	
Color photographic system using grid projector and telecentric lenses for recording contours of human face for aircrew oxygen mask fitting [RAE-TR-71184]	N73-16099
OXYGEN METABOLISM	
Assessment of hypoxia in the human heart.	A73-19928
OXYGEN SPECTRA	
Human endocrine-metabolic responses to graded oxygen pressures.	A73-19479
OXYGEN TENSION	
Russian book - Tissue, oxygen in the presence of extremal flight factors.	A73-19425
Human endocrine-metabolic responses to graded oxygen pressures.	A73-19479
OXYHEMOGLOBIN	
Significance of the Bohr and Haldane effects in the pulmonary capillary.	A73-21614
P	
P-531 HELICOPTER	
Measurement and effects of triaxial vibration on pilots in P-531 (Scout) helicopter under different flight conditions [ISVR-TR-58]	N73-16100
PAINTS	
X ray fluorescence analysis for determining lead content of paint on pencils in Goddard supply system	N73-17097
PARALYSIS	
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man.	A73-21505
PARTICULATE SAMPLING	
Microbiological assay procedures for spacecraft cabling, antennas, solar panels, and thermal blankets [NASA-CR-130383]	N73-17109
PASSENGER AIRCRAFT	
Computerized simulation of passenger emergency evacuation efficiency using Boeing 720 aircraft models [FAA-AM-72-30]	N73-17119
PATHOGENESIS	
Pathogenesis of some respiration and circulation reactions to barometric pressure gradients	A73-20980
PATTERN RECOGNITION	
Inter-hemispheric transfer of meaningful visual information in normal human subjects.	A73-20123
Electrical stimulation effects of human eye on photic threshold for square wave vision as function of wavelength, orientation and spatial frequency	A73-20260
The role of colour perception and 'pattern' recognition in stereopsis.	A73-20266
PEENS	
X ray fluorescence analysis for determining lead content of paint on pencils in Goddard supply system	N73-17097
PEPTIDES	
Stochastic model application to divergence of horse-pig lineage from common ancestor in terms of hemoglobin and fibrinopeptides alpha and beta chains	A73-19218
PERFORMANCE PREDICTION	
Current status of models for the human operator as a controller and decision maker in manned aerospace systems.	A73-20587
PERFORMANCE TESTS	
Central nervous system stresses effects estimation, discussing ocular positioning movements functional significance and psychological processes	A73-21542
PERSONNEL MANAGEMENT	
Industrial model for leave and overtime taking behavior of employees exposed to peak work activity periods in relation to health, demography, and job variables	N73-17055
Automated medical history questionnaire for screening industrial personnel and scheduling physical examinations	N73-17060
Computerized multivariate scheduling of physical examinations for NASA personnel in clinical intervention program	N73-17068
Physical exercise effects on health of NASA personnel	N73-17069
Continuous monitoring of hypertension and hypercholesterolemia in NASA employees for prevention of heart disease and disability	N73-17072
Industrial health measures and environmental control to insure worker productivity	N73-17077
Conference on occupational and environmental medical services provided to NASA employees [NASA-TR-X-69074]	N73-17078
Management of NASA employee health problems by automated medical system	N73-17079
Influence of repeated test and dietary counseling on hypercholesterolemia control in NASA employees	N73-17081
Chronic disease health trends and mortality rates in employee population of NASA Goddard Space Flight Center	N73-17086
Medical services of operating environmental health programs for industrial workers	N73-17093
PERSONNEL SELECTION	
Multiphase health screening and medical history questionnaire for preventive/occupational physical examinations	N73-17052

PB FACTOR**SUBJECT INDEX****pH FACTOR**

An implantable glass electrode used for pH measurement in working skeletal muscle.

A73-21510

PHARMACOLOGY

Effect of some pharmacological preparations on the fall-out nystagmus and Bechterew nystagnus

A73-20982

The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics.

A73-21464

Pharmacologic investigations of antagonistic effects of pyridines on isolated guinea pig ileum [BMVG-FBWT-72-14]

N73-16075

PHOSPHATES

Effect of protective barrier creams on toxic alkyl phosphate penetration of pig skin [BMVG-PBWT-72-15]

N73-16076

PHOTOCHEMISM

Photochemical receptor mechanism of chromatic vision and scotopic contrast hue sensation due to cone and rod activity interaction

A73-20261

PHOTOGRAPHIC RECORDING

Color photographic system using grid projector and telecentric lenses for recording contours of human face for aircrew oxygen mask fitting [RAE-TR-71184]

N73-16099

PHOTORECEPTORS

Photochemical receptor mechanism of chromatic vision and scotopic contrast hue sensation due to cone and rod activity interaction

A73-20261

Modified rhodopsin in the pigment epithelium

A73-20263

PHOTOSENSITIVITY

Photosensitized inhibitor formation in isolated, aging chloroplasts.

A73-20453

PHOTOSYNTHESIS

Photosensitized inhibitor formation in isolated, aging chloroplasts.

A73-20453

Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria.

A73-21685

PHYSICAL EXAMINATIONS

Conference on occupational medicine support in NASA programs to prevent health and emotional problems in personnel [NASA-TM-X-69072]

N73-17048

Medical examinations and protection procedures for NASA employees working in radiologically controlled areas

N73-17050

Physical exercise and physical fitness program for preventing and treating human coronary heart disease

N73-17051

Multiphase health screening and medical history questionnaire for preventive/occupational physical examinations

N73-17052

Automated medical history questionnaire for screening industrial personnel and scheduling physical examinations

N73-17060

Routine proctosigmoidoscopic examinations of asymptotic NASA personnel for cancer prevention

N73-17061

Conference on preventive medical and environmental control measures for NASA and aviation industry personnel management [NASA-TM-X-69073]

N73-17064

Dynamic electrocardiography in periodic health examinations for detection of cardiac abnormalities

N73-17065

Computerized multivariate scheduling of physical examinations for NASA personnel in clinical intervention program

N73-17068

Continuous monitoring of hypertension and hypercholesterolemia in NASA employees for prevention of heart disease and disability

N73-17072

Periodic health examinations and automatic processing of medical histories for detection and prevention of human diseases

N73-17074

Blood pressure and cholesterol level screening for preventing heart diseases in flight crews of commercial airline

N73-17076

PHYSICAL EXERCISE

Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise

A73-20034

A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man.

A73-20369

Cardiovascular changes in middle-aged men during two years of training.

A73-21504

Central, femoral, and brachial circulation during exercise in hypoxia.

A73-21506

Changes in total plasma content of electrolytes and proteins with maximal exercise.

A73-21507

Effect of training on enzyme activity and fiber composition of human skeletal muscle.

A73-21508

On-line computer analysis and breath-by-breath graphical display of exercise function tests.

A73-21511

Inability of the submaximal treadmill stress test to predict the location of coronary disease.

A73-21802

Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects.

A73-21803

Physical exercise and physical fitness program for preventing and treating human coronary heart disease

N73-17051

Long term exercise effects on cardiovascular response in NASA personnel with periodic ergometric evaluation

N73-17067

Physical exercise effects on health of NASA personnel

N73-17069

Feasibility of effective exercise and health evaluation and enhancement program for NASA employees

N73-17091

Influence of NASA stress lab program on physical education in US colleges

N73-17092

PHYSICAL FITNESS

Physical exercise and physical fitness program for preventing and treating human coronary heart disease

N73-17051

Influence of NASA stress lab program on physical education in US colleges

N73-17092

PHYSICAL WORK

Adenonucleotides, NAD+, and NADH in skeletal muscles during intensive work and at rest

A73-19475

Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress

A73-19643

Correlation of physical activity and oxygen consumption between man and mouse [FOA-1-B-1233-A5]

N73-17108

PHYSIOLOGICAL DEFENSES

The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies

A73-19647

PHYSIOLOGICAL EFFECTS

Mountain inhabitants physiological characteristics due to altitude effects, investigating human tolerance and adaptation to ambient environment

A73-19212

Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem

A73-21575

SUBJECT INDEX

PROTECTIVE CLOTHING

- Diurnal dynamics of psychic performance during 72-hour continuous wakefulness N73-16056
- Physiological effects of high mountain alpinism exercises on human body N73-16058
- PHYSIOLOGICAL FACTORS**
- Prolonged weightlessness effects on physiological functions of dogs [NASA-TT-P-14672] N73-17110
- PHYSIOLOGICAL RESPONSES**
- Human endocrine-metabolic responses to graded oxygen pressures. A73-19479
 - Physiology of depressed metabolic states and gastrointestinal responses to ionizing radiation [NASA-CR-130381] N73-16038
 - Personality, occupation, and job stress effects on physiological risk factor in human coronary heart disease N73-17054
 - Influence of infrasound on human body functions N73-17085
 - Influence of 100 percent anhydrous ammonia environment on body functions N73-17088
- PHYSIOLOGICAL TESTS**
- On-line computer analysis and breath-by-breath graphical display of exercise function tests. A73-21511
 - Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects. A73-21803
- PILOT PERFORMANCE**
- Case histories of valvular cardiopathies in military pilots, determining tolerance to flight A73-19209
 - Civil aviation medicine in the coming decade. A73-19484
 - Conceptual model for pilot workload N73-17010
 - Pilot performance during simulated standard instrument procedure turn with and without predictor display [NASA-TM-X-62201] N73-17118
- PILOTS (PERSONNEL)**
- Measurement and effects of triaxial vibration on pilots in P-531 (Scout) helicopter under different flight conditions [ISVA-TR-58] N73-16100
- PIPE FLOW**
- Blood vessels simulation by muscle pump represented by elastically deformable pipe with valves, solving Navier-Stokes equation for viscous fluid flow A73-21375
- PITUITARY HORMONES**
- Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropin hormone excretion levels at various stages of ontogenesis A73-21319
- PLANETARY LANDING**
- Analysis of standards and procedures for planetary quarantine with emphasis on determination of mission specifications [NASA-CR-130558] N73-17103
- PLANETARY QUARANTINE**
- Soil sampling and microorganism analysis in planetary spacecraft assembly area for prevention of Mars contamination [NASA-CR-130009] N73-16059
 - Analysis of standards and procedures for planetary quarantine with emphasis on determination of mission specifications [NASA-CR-130558] N73-17103
- PLASMA SPRAYING**
- Synthesis of reverse osmosis membranes by plasma polymerization of allylamine. A73-19169
- PLATELETS**
- Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current A73-21321
 - Intravascular platelet aggregation in the heart induced by stress. A73-21805
- PLENUM CHAMBERS**
- Design and performance of exhaust hood with protective air current outside of hood surface N73-17063
- PLETHYSMOGRAPHY**
- Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms. A73-21612
- PNEUMOGRAPHY**
- Heated Fleisch pneumotachometer - A calibration procedure. A73-21509
- POIKILOTERMIA**
- Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms. A73-21612
- POLARIZATION CHARACTERISTICS**
- Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Hock A73-21135
- POLYMERIC FILMS**
- Synthesis of reverse osmosis membranes by plasma polymerization of allylamine. A73-19169
- POLYMERIZATION**
- Synthesis of reverse osmosis membranes by plasma polymerization of allylamine. A73-19169
- POSTURE**
- Vertical posture control after Soyuz 6, 7 and 8 flights and 120-day hypokinesia A73-20985
 - The interaction between muscle groups in a complex motor act in humans A73-21320
 - Regulation of vertical posture after Soyuz 6, 7, and 8 flights and after 120-day bed rest experiment N73-16052
- POTABLE WATER**
- Environmental health measures to prevent cabin atmosphere toxicity and provide drinking water standards in manned space flight applications N73-17058
- POTTING COMPOUNDS**
- Nonsporicidal methods for solvent degradation of cured RTV 41 silicon potting compound and chemical curing effects on decontamination properties [NASA-CR-1307201] N73-17111
- PREDICTIONS**
- Risk scoring system for identifying subjects with high risk to coronary heart disease N73-17080
- PRESSURE CHAMBERS**
- Coding data of 2565 individual human altitude chamber tests [NASA-CR-114550] N73-16066
- PROPELLANT EVAPORATION**
- Evaporation rates and toxic plume dispersion for defining downwind evacuation areas for populations adjacent to accidental propellant spills on shipping routes [NASA-TM-X-68188] N73-16097
- PROPELLANT TRANSPORT**
- Rocket propellant handling personnel protective clothing, describing head gear, ventilated underwear and airtight external suit A73-18949
- PROPHYLAXIS**
- Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990
- PROSTHETIC DEVICES**
- Design and development of biomedical prosthetic and electronic devices [NASA-CR-130022] N73-16093
- PROTECTIVE CLOTHING**
- Rocket propellant handling personnel protective clothing, describing head gear, ventilated underwear and airtight external suit A73-18949
 - Thermal protective garment using independent regional control of coolant temperature. A73-19481

PROTECTIVE COATINGS

SUBJECT INDEX

PROTECTIVE COATINGS	
Effect of protective barrier creams on toxic alkyl phosphate penetration of pig skin [BMVG-FBWT-72-15]	N73-16076
PROTEIN METABOLISM	
Adenonucleotides, NAD+, and NADH in skeletal muscles during intensive work and at rest	A73-19475
Thermal factor and dehydration influences on protidic and lipidic catabolisms of young men with partial food deprivation in hot climate, discussing metabolic balances	A73-21248
Changes in total plasma content of electrolytes and proteins with maximal exercise.	A73-21507
Proteinuria and civil aviation aircrew	A73-21538
Proteinuria and military aircrew	A73-21539
PROTEINS	
Silk fibroin, collagen, glycoproteins, keratin and protasines formation in single evolutionary event by de novo synthesis of DNA	A73-19219
Action of a serum protein on muscular contraction.	A73-21200
PROTON MAGNETIC RESONANCE	
Proton magnetic resonance spectra and calorimetry of interactions between ions, inhibitors, and substrates with two ribonucleases [BMVG-FBWT-72-7]	N73-16071
Proton magnetic resonance spectra of ribonuclease A inhibitor complexes, noting effect on catalytic activity [BMVG-FBWT-72-13]	N73-16074
PSYCHOACOUSTICS	
German monograph - The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials.	A73-20389
PSYCHOLOGICAL EFFECTS	
Recorded observations of crew member activities during Tektite 2 underwater habitability study [NASA-CR-130034]	N73-16094
PSYCHOLOGICAL TESTS	
Central nervous system stresses effects estimation, discussing ocular positioning movements functional significance and psychological processes	A73-21542
PSYCHOMETRICS	
German monograph - Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram.	A73-20391
PSYCHOMOTOR PERFORMANCE	
Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia	A73-20985
The interaction between muscle groups in a complex motor act in humans	A73-21320
Standardized performance battery for assessing effects of environmental stressors particularly noise on human performance [NASA-CR-2149]	N73-17102
Choice reaction tasks for discriminating individual skill potentials in information handling situations [AD-752073]	N73-17115
PSYCHOPHYSICS	
Inter-hemispheric transfer of meaningful visual information in normal human subjects.	A73-20123
Human receptive visual field adaptation characteristics for stabilized retinal images by psychophysical probe detection technique	A73-20252
Psychophysical areal summation and stimulus contour and threshold visibility effects on size selective adaptation in human vision for single- and multichannel models	A73-21563
PSYCHOPHYSIOLOGY	
Choice reaction tasks for discriminating individual skill potentials in information handling situations [AD-752073]	N73-17115
PSYCHOTHERAPY	
Mental health services for emotional counselling in NASA facilities to insure maximum human performance	N73-17062
PULMONARY CIRCULATION	
Time course of pulmonary vascular response to hypoxia in dogs.	A73-20168
Sinus venosus atrial septal defect - Analysis of fifty cases.	A73-20368
Pathogenesis of some respiration and circulation reactions to barometric pressure gradients	A73-20980
Significance of the Bohr and Haldane effects in the pulmonary capillary.	A73-21614
A model of time-varying gas exchange in the human lung during a respiratory cycle at rest.	A73-21615
Sensory receptors irritation and cardiopulmonary toxicity from fluorocarbon propellants [AD-751426]	N73-16089
PULMONARY FUNCTIONS	
Predictions of the dynamic response of the lung.	A73-19477
Respiration mechanics during weightlessness simulation in an immersion medium	A73-20986
Effects of lung volume and disease on the lung nitrogen decay curve.	A73-21501
Cardiovascular changes in middle-aged men during two years of training.	A73-21504
Effects of anaesthesia and muscle paralysis on respiratory mechanics in normal man.	A73-21505
Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms.	A73-21612
Pulmonary respiration and acid-base state in hibernating marmots and hamsters.	A73-21613
PUPILLOMETRY	
Pupillometry using advanced design oculometer [AD-752121]	N73-17116
PURSUIT TRACKING	
Heuristic response strategies and operator performance errors as function of practice in cross coupled pursuit tracking control tasks	A73-19548
PYRIDINES	
Protective effects of pyridinium salts against alkyl phosphate poisoning including influence of chemical and aging [BMVG-FBWT-72-8]	N73-16072
Pharmacologic investigations of antagonistic effects of pyridines on isolated guinea pig ileum [BMVG-FBWT-72-14]	N73-16075
PYROLYSIS	
Toxicity of pyrolysis products from chlorotrifluoroethylene-ethylene copolymer Halar resin [AD-751436]	N73-16080
PYRUVATES	
Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria.	A73-19500
R	
RABBITS	
Fever generation in rabbits by intravenous injection of table salt [NASA-TT-F-14677]	N73-16063
RADIATION DOSAGE	
Cosmic radiation and research carried out on board the OOI prototype Concorde	A73-19211
Occupational hazards and adverse biological effects of ultraviolet radiation	N73-17094

SUBJECT INDEX

RESPIRATORY PHYSIOLOGY

Measurement of radiation exposure of astronauts by radiochemical techniques [NASA-CR-130538]	N73-17114	A method for electrocardiogram recording in Rhesus monkeys A73-21324
RADIATION EFFECTS		
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products	A73-20984	RECTUM
Abstracts on radiation and health physics [BNHL-1651-VOL-2-PT-2]	N73-16069	Routine proctosigmoidoscopic examinations of asymptotic NASA personnel for cancer prevention N73-17061
RADIATION HAZARDS		
Test evaluation of laser protective visors for flight crews [AD-751470]	N73-16102	REFLECTANCE
Medical examinations and protection procedures for NASA employees working in radiologically controlled areas	N73-17050	Reflectance, transmittance and absorbance spectra of normal and six types of maize leaves [NASA-CR-130032] N73-16065
Occupational hazards and adverse biological effects of ultraviolet radiation	N73-17094	REFLEXES
Chorioretinal burn hazards of high intensity radiation sources in industry	N73-17071	Ontogenetic cerebrospinal reflex activity studies, covering spinal cord morphology, reflex arches, inhibition, intracentral responses and post-tetanic potentiation A73-20366
RADIATION PROTECTION		
Medical examinations and protection procedures for NASA employees working in radiologically controlled areas	N73-17050	REGRESSION ANALYSIS
Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria.	A73-19483	Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322
Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation	A73-20981	REMOTE CONTROL
RADIOBIOLOGY		Concept evaluation and subsystem analyses for design of remote controlled teleoperator visual system [NASA-CR-124059] N73-17117
Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria.	A73-19483	REMOTE SENSORS
Industrial hygiene, radiological health, and spacecraft sanitation studies in NASA Environmental Health Program	N73-17057	Remote sensing techniques for detection and prevention of Rocky Mountain spotted fever, Encephalitis, Malaria, and Red Tide environmental health problems [NASA-CR-128727] N73-16060
RADIOCHEMISTRY		Multispectral remote sensing techniques for identification of corn blight disease [NASA-TM-X-69055] N73-16064
Measurement of radiation exposure of astronauts by radiochemical techniques [NASA-CR-130538]	N73-17114	Multispectral remote sensing techniques applied to study changes in wildlife habitats N73-16396
RADIOGRAPHY		
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms.	A73-19124	RENAL FUNCTION
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography.	A73-21801	Renal component of the antigravitation function of the organism A73-20976
RADIOLOGY		Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours A73-20978
Medical examinations and protection procedures for NASA employees working in radiologically controlled areas	N73-17050	Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta. A73-21199
RATINGS		Renal lithiasis among civil operating aircrew A73-21536
Linear rating scale for selecting tracking task parameters by subjective operator [AD-752036]	N73-17125	Renal lithiasis among military operating aircrew A73-21537
RATS		Renal component of antigravitational function in body N73-16043
Morphological changes in juxtaglomerular apparatus in kidneys of rats during multihour exposure to accelerations in different directions	N73-16045	RESEARCH FACILITIES
Thermoregulation reactions of rats in hypoxic atmosphere with nitrogen and helium dilution	N73-16046	Feasibility of effective exercise and health evaluation and enhancement program for NASA employees N73-17091
Effect of prolonged hypodynesia on rat biology	N73-16050	RESIDENTIAL AREAS
Weightlessness effects on development of vestibular apparatus and ocular nystagmus in rat, using chronic 2g centrifuge [NASA-CR-114569]	N73-17112	Evaporation rates and toxic plume dispersion for defining downwind evacuation areas for populations adjacent to accidental propellant spills on shipping routes [NASA-TM-X-68188] N73-16097
RECORDING INSTRUMENTS		RESPIRATION
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects.	A73-19932	Changes in lung capacity, air passage resistance, and dynamic compliance of humans during water immersion to simulate weightlessness N73-16053

RESPIRATORY RATE**SUBJECT INDEX**

- A model to predict respiration from VCG measurements. A73-20578
- Respiration mechanics during weightlessness simulation in an immersion medium A73-20986
- High altitude acclimatization and mountain climbing effects on human organism, considering oculomotor, cardiovascular and respiratory responses and endurance A73-20991
- Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322
- Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. A73-21505
- On-line computer analysis and breath-by-breath graphical display of exercise function tests. A73-21511
- Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms. A73-21612
- Pulmonary respiration and acid-base state in hibernating marmots and hamsters. A73-21613
- A model of time-varying gas exchange in the human lung during a respiratory cycle at rest. A73-21615
- RESPIRATORY RATE**
- Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise A73-20034
- A respirometer for the continuous measurement of respiration volume with remote transmission A73-20035
- Pathogenesis of some respiratory and circulatory reactions accompanying drop in barometric pressure N73-16047
- RESPIRATORY REFLXES**
- Pathogenesis of some respiration and circulation reactions to barometric pressure gradients A73-20980
- RESPIROMETERS**
- A respirometer for the continuous measurement of respiration volume with remote transmission A73-20035
- REST**
- A model of time-varying gas exchange in the human lung during a respiratory cycle at rest. A73-21615
- RETINA**
- Photochemical receptor mechanism of chromatic vision and scotopic contrast hue sensation due to cone and rod activity interaction A73-20261
- Modified rhodopsin in the pigment epithelium. A73-20263
- Contrast and assimilation effects analysis based on receptive field models of vertebrate retinal function A73-20812
- Chorioretinal burn hazards of high intensity radiation sources in industry N73-17071
- RETINAL ADAPTATION**
- Human receptive visual field adaptation characteristics for stabilized retinal images by psychophysical probe detection technique A73-20252
- Psychophysical areal summation and stimulus contour and threshold visibility effects on size selective adaptation in human vision for single- and multichannel models A73-21563
- RETINAL IMAGES**
- Vernier alignment acuity task accuracy related to retinal image line position location, noting effect of high contrast grating background A73-20159
- Human receptive visual field adaptation characteristics for stabilized retinal images by psychophysical probe detection technique A73-20252
- Intrinsic light brightness and intensity estimation tests for foveal and peripheral retina under photopic and scotopic stimuli A73-20257
- Cyclofusional stimulation effects on retinal image disparity in terms of central component and Panum fusional areas A73-20265
- Saccadic suppression for structured background as function of visual image pattern and threshold detection elevation in central nervous system A73-20267
- Human retina-patterned ideal perceiving machine to calculate visual acuities for spatial arrangement in line figures A73-21564
- Single cell analysis of saturation discrimination in the macaque. A73-21568
- Polarity cue for visual accommodation response of trained subjects to target motion direction change, considering retinal image blur and feedback relation A73-21569
- RIBONUCLEIC ACIDS**
- Ribosomal RNA base composition and molecular evolution in plants and animals of various taxonomic groups A73-19220
- Proton magnetic resonance spectra of ribonuclease A inhibitor complexes, noting effect on catalytic activity [BMVG-PBWT-72-13] N73-16074
- RISK**
- Risk scoring system for identifying subjects with high risk to coronary heart disease N73-17080
- ROCKET PROPELLANTS**
- Rocket propellant handling personnel protective clothing, describing head gear, ventilated underwear and airtight external suit A73-18949
- RODS**
- Photochemical receptor mechanism of chromatic vision and scotopic contrast hue sensation due to cone and rod activity interaction A73-20261
- ROTATING BODIES**
- Rotating target providing high yield neutrons by Be-4 reaction for cancer therapy [NASA-TM-X-68179] N73-16067
- S**
- SAFETY DEVICES**
- Modulated light transmission for electrical isolation in a multichannel physiological monitoring system. A73-19482
- SAMPLING**
- Automatic swabbing apparatus for sampling of microbiological surfaces [NASA-CASE-LAR-11069-1] N73-16061
- SANITATION**
- Industrial hygiene, radiological health, and spacecraft sanitation studies in NASA Environmental Health Program N73-17057
- SCHEDULING**
- Automated medical history questionnaire for screening industrial personnel and scheduling physical examinations N73-17060
- Computerized multivariate scheduling of physical examinations for NASA personnel in clinical intervention program N73-17068
- SELF ORGANIZING SYSTEMS**
- Automation synthesis and perceptron learning for controlled objects classification according to unknown features, noting adaptive relationships between retina and associative elements A73-20047
- SENSITIVITY**
- Evaluation of sex difference in thermal sensitivity in men and women [NASA-CR-114564] N73-17113

SUBJECT INDEX

SPACERCREWS

SENSOMOTOR PERFORMANCE		
Disorienting effects of aircraft catapult launchings.	A73-19480	
Changes in the amplitudinal and temporal characteristics of sensomotor-cortex evoked potentials after deactivation of spinocervical tracts in cats	A73-20004	
SENSORY DEPRIVATION		
Modulated light transmission for electrical isolation in a multichannel physiological monitoring system.	A73-19482	
SENSORY FEEDBACK		
Polarity cue for visual accomodation response of trained subjects to target motion direction change, considering retinal image blur and feedback relation	A73-21569	
SENSORY PERCEPTION		
Sensory receptors irritation and cardiopulmonary toxicity from fluorocarbon propellants [AD-751426]	N73-16089	
SENSORY STIMULATION		
German monograph on human information transmission by multidimensional tactile stimuli investigation using method of learned signals identification	A73-20393	
SEBOSTHIS		
Mediator systems and respiratory function during an acute lethal loss of blood	A73-19645	
SEBUMS		
Action of a serum protein on muscular contraction.	A73-21200	
Stabilization methods in collecting and shipping of human sera for chemical analyses	N73-17053	
SIGNAL PROCESSING		
Information processing in the visual system.	A73-20374	
SIGNAL TRANSMISSION		
German monograph on human information transmission by multidimensional tactile stimuli investigation using method of learned signals identification	A73-20393	
SIGNS AND SYMPTOMS		
Influence of infrasound on human body functions	N73-17085	
SINUSES		
Sinus venosus atrial septal defect - Analysis of fifty cases.	A73-20368	
SKIN (ANATOMY)		
Effect of protective barrier creams on toxic alkyl phosphate penetration of pig skin [BMVG-PBT-72-15]	N73-16076	
Evaluation of sex difference in thermal sensitivity in men and women [NASA-CR-114564]	N73-17113	
SLEEP		
The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics.	A73-21464	
Non-Gaussian properties of the EEG during sleep.	A73-21965	
Activity cycle data for spacecrews of Soyuz 3 to 9 spacecrafts before, during and after space flights [JPRS-58173]	N73-16068	
SLEEP DEPRIVATION		
Diurnal dynamics of psychic performance during 72-hour continuous wakefulness	A73-16056	
SODIUM CARBOHATES		
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness	A73-20990	
Effectiveness of sodium hydrocarbonate as means for treating and preventing motion sickness	N73-16057	
SODIUM CHLORIDES		
Fever generation in rabbits by intravenous injection of table salt [NASA-TT-F-14677]	N73-16063	
SOIL SCIENCE		
Survival of <i>Arthrobacter crystallopoietes</i> during prolonged periods of extreme desiccation.	A73-20026	
SOILS		
Soil sampling and microorganism analysis in planetary spacecraft assembly area for prevention of Mars contamination [NASA-CR-130009].	N73-16059	
SOLAR FLARES		
Solar flare frequency and associated physical phenomena diversity, discussing earth atmosphere protective effects and impact on Concorde flights	A73-19210	
SOYUZ SPACECRAFT		
Activity cycle data for spacecrews of Soyuz 3 to 9 spacecrafts before, during and after space flights [JPRS-58173]	N73-16068	
SPACE FLIGHT STRESSES		
Emotional stresses during a space flight	A73-19297	
Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia	A73-20985	
Regulation of vertical posture after Soyuz 6, 7, and 8 flights and after 120-day bed rest experiment	N73-16052	
SPACE PERCEPTION		
Disorienting effects of aircraft catapult launchings.	A73-19480	
Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn.	A73-19485	
Psychophysical areal summation and stimulus contour and threshold visibility effects on size selective adaptation in human vision for single- and multichannel models	A73-21563	
Human retina-patterned ideal perceiving machine to calculate visual acuities for spatial arrangement in line figures	A73-21564	
Polarity cue for visual accomodation response of trained subjects to target motion direction change, considering retinal image blur and feedback relation	A73-21569	
SPACE SUITS		
Development of prototype high pressure space suit glove assembly [NASA-CR-114535]	N73-17120	
SPACECRAFT CABIN ATMOSPHERES		
Environmental health measures to prevent cabin atmosphere toxicity and provide drinking water standards in manned space flight applications	N73-17058	
SPACECRAFT COMPONENTS		
Microbiological assay procedures for spacecraft cabling, antennas, solar panels, and thermal blankets [NASA-CR-130383]	N73-17109	
SPACECRAFT ENVIRONMENTS		
Industrial hygiene, radiological health, and spacecraft sanitation studies in NASA Environmental Health Program	N73-17057	
SPACECRAFT STERILIZATION		
Analysis of standards and precedures for planetary quarantine with emphasis on determination of mission specifications [NASA-CR-130558]	N73-17103	
Nonsporcidic methods for solvent degradation of cured RTV 41 silicon potting compound and chemical curing effects on decontamination properties [NASA-CR-1307201]	N73-17111	
Evaluation of sterile access technique for repair and adjustment of sterile spacecraft [NASA-TM-D-71471]	N73-17122	
SPACECREWS		
Activity cycle data for spacecrews of Soyuz 3 to 9 spacecrafts before, during and after space flights [JPRS-58173]	N73-16068	

SPECTRUM ANALYSIS

SUBJECT INDEX

Occupational medicine procedures for personnel in lunar receiving laboratory for Apollo 11 crew members	N73-17049
SPECTRUM ANALYSIS	
Non-Gaussian properties of the EEG during sleep.	A73-21465
SPEECH	
Cerebral localization of speech, discussing cortical lesions, aphasia and mental activity correlation theories	A73-21425
SPECH RECOGNITION	
Structural vibration and noise effects on man in aerospace operations [AGARDOGRAPH-151]	N73-17098
Noise effects on hearing conservation in aircREW and ground support personnel of aerospace operations	N73-17101
SPEED CONTROL	
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects.	A73-19932
SPERMATOGENESIS	
Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation	A73-20981
Morphological changes in testes and spermatogenesis process of dogs subjected to chronic and combined gamma irradiation	N73-16048
SPHYGMOGRAHY	
Method for measuring the contractions of small hearts in organ culture.	A73-21218
SPILLING	
Evaporation rates and toxic plume dispersion for defining downwind evacuation areas for populations adjacent to accidental propellant spills on shipping routes [NASA-TM-X-68188]	N73-16097
SPINAL CORD	
Electrophysiological investigation of suprasegmental motor control systems evolution through Cyclostomata-Primate series, noting preservation of reticulomotor neuron projection characteristics	A73-20001
Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculi of the cat spinal cord	A73-20002
Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents	A73-20003
Changes in the amplitudinal and temporal characteristics of somatosensor-cortex evoked potentials after deactivation of spinocervical tracts in cats	A73-20004
Ontogenetic cerebrospinal reflex activity studies, covering spinal cord morphology, reflex arches, inhibition, intracentral responses and post-tetanic potentiation	A73-20366
SPORES	
Nonsporcidal methods for solvent degradation of cured RTV 41 silicon potting compound and chemical curing effects on decontamination properties [NASA-CR-130720]	N73-17111
STABILIZATION	
Stabilization methods in collecting and shipping of human sera for chemical analyses	N73-17053
STANDARDS	
Public health exposure limits to nitrogen oxide, hydrogen chloride, and hydrogen fluoride air pollutants [AD-751438]	N73-16084
Public health exposure limits for air pollutants [AD-751437]	N73-16088
STAPHYLOCOCCUS	
Cinematographic study of the development of subsurface colonies of <i>Staphylococcus aureus</i> in soft agar.	A73-21828
STATISTICAL ANALYSIS	
Renal lithiasis among civil operating aircREW	A73-21536
STEREOSCOPIC VISION	
The role of colour perception and 'pattern' recognition in stereopsis.	A73-20266
STOCHASTIC PROCESSES	
Stochastic model application to divergence of horse-pig lineage from common ancestor in terms of hemoglobin and fibrinopeptides alpha and beta chains	A73-19218
STRESS (PHYSIOLOGY)	
Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress	A73-19644
The contractile function of the myocardium in two types of cardiac adaptation to a chronic load.	A73-19931
Human tendon stress recovery after load removal as function of time, sex, age and side differences	A73-20033
Catecholamine exchange in the hormonal and mediator links of the sympathetic-adrenal system under stress	A73-20367
Inability of the submaximal treadmill stress test to predict the location of coronary disease.	A73-21802
Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects.	A73-21803
Intravascular platelet aggregation in the heart induced by stress.	A73-21805
Dynamic electrocardiography in periodic health examinations for detection of cardiac abnormalities	N73-17065
Electrocardiographic stress testing for determining influence of occupational and other stresses on ischemic heart disease	N73-17082
STRESS (PSYCHOLOGY)	
German monograph - Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modifiability.	A73-20388
German monograph - The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials.	A73-20389
Central nervous system stresses effects estimation, discussing ocular positioning movements functional significance and psychological processes	A73-21542
Personality, occupation, and job stress effects on physiological risk factor in human coronary heart disease	N73-17054
Standardized performance battery for assessing effects of environmental stressors particularly noise on human performance [NASA-CR-2149]	N73-17102
Indices of emotional stress in cosmonauts during Voskhod 2 and Soyuz flights [JPRS-58039]	N73-17104
STRUCTURAL DESIGN	
Design and performance of exhaust hood with protective air current outside of hood surface	N73-17063
Concept evaluation and subsystem analyses for design of remote controlled teleoperator visual system [NASA-CR-124059]	N73-17117
Multivariate limits for describing cockpit related anthropometric features of aviation personnel [AD-752032]	N73-17124

SUBJECT INDEX

THRESHOLDS (PERCEPTION)

STRUCTURAL VIBRATION	
Structural vibrations in aerospace operations and effects on man	N73-17099
SUBMERGING	
Respiration mechanics during weightlessness. simulation in an immersion medium	A73-20986
Changes in lung capacity, air passage resistance, and dynamic compliance of humans during water immersion to simulate weightlessness	N73-16053
SURFACE PROPERTIES	
Automatic swabbing apparatus for sampling of microbiological surfaces [NASA-CASE-LAR-11069-1]	N73-16061
SYMPATHETIC NERVOUS SYSTEM	
Catecholamine exchange in the hormonal and mediator links of the sympatheticoadrenal system under stress	A73-20367
Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension.	A73-21015
SYNAPSES	
Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem	A73-19650
Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents	A73-20003
SYSTEMS ANALYSIS	
Concept evaluation and subsystem analyses for design of remote controlled teleoperator visual system [NASA-CR-124059]	N73-17117
Evaluation of sterile access technique for repair and adjustment of sterile spacecraft [NASA-TN-D-7147]	N73-17122
SYSTEMS STABILITY	
Stability behavior of adapting and untrained random logic nets, enabling intelligent interaction with environment	A73-20400
SYSTOLE	
A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man.	A73-20369
T	
TACHOMETRIES	
Heated Fleisch pneumotachometer - A calibration procedure.	A73-21509
TACTILE DISCRIMINATION	
German monograph on human information transmission by multidimensional tactile stimuli investigation using method of learned signals identification	A73-20393
TARGET RECOGNITION	
Autokinetic movement as a function of the implied movement of target shape.	A73-19549
Evaluation of device to train forward air controllers to communicate target locations [AD-751292]	N73-16103
TARGETS	
Rotating target providing high yield neutrons by Be-9 reaction for cancer therapy [NASA-TM-X-68179]	N73-16067
TAXONOMY	
Ribosomal RNA base composition and molecular evolution in plants and animals of various taxonomic groups	A73-19220
TECHNOLOGY UTILIZATION	
Applications of aerospace technology in biology and medicine [NASA-CR-13054]	N73-17047
TEXTITE PROJECT	
Recorded observations of crew member activities during Textite 2 underwater habitability study [NASA-CR-130034]	N73-16094
TELEOPERATORS	
Concept evaluation and subsystem analyses for design of remote controlled teleoperator visual system [NASA-CR-124059]	N73-17117
TEMPERATURE COMPENSATION	
Heated Fleisch pneumotachometer - A calibration procedure.	A73-21509
TEMPERATURE EFFECTS	
The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture	A73-19649
Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem	A73-21575
TENDONS	
Human tendon stress recovery after load removal as function of time, sex, age and side differences	A73-20033
TESTES	
Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation	A73-20981
Morphological changes in testes and spermatogenesis process of dogs subjected to chronic and combined gamma irradiation	N73-16048
 THERMAL DIFFUSION	
Analysis of indicator distribution in the determination of cardiac output by thermal dilution.	A73-21216
Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter.	A73-21217
 THERMAL PROTECTION	
Thermal protective garment using independent regional control of coolant temperature.	A73-19481
 THERMOPHILES	
Spin-labeling studies on the membrane of a facultative thermophilic bacillus.	A73-20027
 THERMOREGULATION	
Thermal protective garment using independent regional control of coolant temperature.	A73-19481
Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere	A73-20979
Thermoregulation reactions of rats in hypoxic atmosphere with nitrogen and helium dilution	N73-16046
 THIAMINE	
Effect of accelerations on the thiamine-S/35/distribution in the organism of white mice	A73-20977
Effect of accelerations on thiamine S-35/distribution in organs, tissues, and subcellular structures of white mice	N73-16044
 THRESHOLDS (PERCEPTION)	
Dynamic properties of vision. III - Twin flashes, single flashes and flickerfusion.	A73-20253
Stimulus effect on spatial summation of color receptive pathways and discrimination thresholds as function of color, gradient, retinal illumination and field size	A73-20254
Electrical stimulation effects of human eye on photic threshold for square wave vision as function of wavelength, orientation and spatial frequency	A73-20260
Threshold variance analysis of monocular vs binocular visual stimulation in apparent movement perception	A73-20262
Saccadic suppression for structured background as function of visual image pattern and threshold detection elevation in central nervous system	A73-20267

THROMBOSIS

SUBJECT INDEX

- Psychophysical areal summation and stimulus contour and threshold visibility effects on size selective adaptation in human vision for single- and multichannel models** A73-21563
The brightness of coloured flashes on backgrounds of various colours and luminances. A73-21565
Visual sensitivity in the presence of alternating monochromatic fields of light. A73-21567
- THROMBOSIS**
Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current A73-21321
Intravascular platelet aggregation in the heart induced by stress. A73-21805
- TIME MEASUREMENT**
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. A73-19932
- TISSUES (BIOLOGY)**
Russian book - Tissue, oxygen in the presence of extremal flight factors. A73-19425
A model for the elastic properties of the lung and their effect on expiratory flow. A73-21502
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- TOXIC DISEASES**
Protective effects of pyridinium salts against alkyl phosphate poisoning including influence of chemical and aging [BNVG-FBWT-72-8] N73-16072
- TOXIC HAZARDS**
Effect of protective barrier creams on toxic alkyl phosphate penetration of pig skin [BNVG-FBWT-72-15] N73-16076
Influence of 100 percent anhydrous ammonia environment on body functions N73-17088
- TOXICITY**
Symptomatic and pathological information from acute toxicity exposure of chlorine pentafluoride [AD-751452] N73-16078
Toxicity of pyrolysis products from chlorotrifluoroethylene-ethylene copolymer Halar resin [AD-751436] N73-16080
Hepatotoxic effects of dichloromethane inhalation in mice [AD-751434] N73-16081
Acute toxicity of brief exposures to HF, HCl, NO₂, and HCN singly and in combination with CO in aircraft cabins [AD-751442] N73-16085
Animal species susceptibility to toxic effects of long term exposure to environmental monomethylhydrazine [AD-751441] N73-16086
- TOXICITY AND SAFETY HAZARD**
Industrial health hazard in chronic exposure to monomethylhydrazine and dose related hemolytic anemia in humans [AD-751440] N73-16087
Cardiac toxicity of fluoroalkane gases for propelling aerosols in industry and household applications [AD-751425] N73-16090
Evaporation rates and toxic plume dispersion for defining downwind evacuation areas for populations adjacent to accidental propellant spills on shipping routes [NASA-TM-X-68188] N73-16097
Environmental health measures to prevent cabin atmosphere toxicity and provide drinking water standards in manned space flight applications N73-17058
Toxicity and safety hazard of dry beryllium copper alloy machining for human operator N73-17059
- Effects of chemical fire extinguishing agents containing bromotrifluoromethane on cardiovascular and nervous systems of dogs, monkeys, and baboons** [AGARD-R-599] N73-17106
- TOXICOLOGY**
Toxicology of some commercial fluorocarbons [AD-751429] N73-16079
- TRACKING (POSITION)**
Comparison of human operator critical tracking task performance with aural and visual displays. A73-21667
- TRAINING DEVICES**
Effectiveness of training device for air traffic communication and carrier landing control [AD-751556] N73-16101
Evaluation of device to train forward air controllers to communicate target locations [AD-751292] N73-16103
- TRANSFER FUNCTIONS**
On the approximation of the optical modulation transfer function /MTF/ by analytical functions. A73-20264
- TRANSIENT RESPONSE**
Analysis of transient visual sensations above the flicker fusion frequency. A73-21566
- TRANSVERSE ACCELERATION**
Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours A73-20978
- TREADMILLS**
Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects. A73-21803
- TRIAXIAL STRESSES**
Measurement and effects of triaxial vibration on pilots in P-531 (Scout) helicopter under different flight conditions [ISVR-TR-58] N73-16100
- TRYPTOPHAN**
Application of the method of polarization ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Rock A73-21135
- TURNING FLIGHT**
Pilot performance during simulated standard instrument procedure turn with and without predictor display [NASA-TM-X-62201] N73-17118
- U**
- ULTRAVIOLET MICROSCOPY**
Application of the method of polarization ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Rock A73-21135
- ULTRAVIOLET RADIATION**
Chorioretinal burn hazards of high intensity radiation sources in industry N73-17071
Occupational hazards and adverse biological effects of ultraviolet radiation N73-17094
- UNDERWATER STRUCTURES**
Habitability factors during long-term space and undersea missions in confined habitats [NASA-CR-130537] N73-17123
- UNDERWATER TESTS**
Respiration mechanics during weightlessness simulation in an immersion medium A73-20986
- UNIVERSITIES**
Influence of NASA stress lab program on physical education in US colleges N73-17092
- URINALYSIS**
Proteinuria and civil aviation aircrew A73-21538
Proteinuria and military aircrew A73-21539
Clinical practice and problems associated with urine analysis N73-17089

URINATION

Thermal flowmeter for urine volume measurement in
manned space flight environment
[NASA-CR-128726] N73-16095

V

VECTORCARDIOGRAPHY

Orthogonal versus planar vector-electrocardiography.
A73-19930

A model to predict respiration from VCG
measurements. A73-20578

VENTILATION

Effects of lung volume and disease on the lung
nitrogen decay curve. A73-21501

Ventilation measured by body plethysmography in
hibernating mammals and in poikilotherms. A73-21612

VERTEBRATES

Electrophysiological investigation of
suprasegmental motor control systems evolution
through Cyclostomata-Primate series, noting
preservation of reticulomotor neuron projection
characteristics A73-20001

VESTIBULES

Weightlessness effects on development of
vestibular apparatus and ocular nystagmus in
rat, using chronic 2g centrifuge
[NASA-CR-114569] N73-17112

VIABILITY

Survival of Arthrobacter crystallopoietes during
prolonged periods of extreme desiccation. A73-20026

VIBRATION EFFECTS

Measurement and effects of triaxial vibration on
pilots in P-531 (Scout) helicopter under
different flight conditions
[ISVR-TB-58] N73-16100

VIBRATIONAL STRESS

Structural vibration and noise effects on man in
aerospace operations
[AGARDGRAPH-151] N73-17098

VIKING MARS PROGRAM

Soil sampling and microorganism analysis in
planetary spacecraft assembly area for
prevention of Mars contamination
[NASA-CR-130009] N73-16059

VIRUSES

Automated procedures for Passive Immune
Agglutination system
[NASA-CR-128731] N73-17107

VICOSUS FLUIDS

Blood vessels simulation by muscle pump
represented by elastically deformable pipe with
valves, solving Navier-Stokes equation for
viscous fluid flow A73-21375

VISORS

Test evaluation of laser protective visors for
flight crews
[AD-751470] N73-16102

VISUAL ACCOMMODATION

Polarity cue for visual accommodation response of
trained subjects to target motion direction
change, considering retinal image blur and
feedback relation A73-21569

VISUAL ACUITY

Vernier alignment acuity task accuracy related to
retinal image line position location, noting
effect of high contrast grating background
A73-20159

Meridional amblyopia - Evidence for modification
of the human visual system by early visual
experience. A73-21562

Human retina-patterned ideal perceiving machine to
calculate visual acuities for spatial
arrangement in line figures A73-21564

VISUAL DISCRIMINATION

Color naming and hue discrimination in congenital
tritanopia and tritanomaly. A73-20251

Stimulus effect on spatial summation of color
receptive pathways and discrimination thresholds
as function of color, gradient, retinal
illumination and field size A73-20254

Analysis of transient visual sensations above the
flicker fusion frequency. A73-21566

Visual sensitivity in the presence of alternating
monochromatic fields of light. A73-21567

Single cell analysis of saturation discrimination
in the macaque. A73-21568

VISUAL FIELDS

Physiological mechanisms of evoked-potential
habituation in the visual analyzer A73-20006

Attention field and perception probability
distribution mechanisms of Muller-Lyer illusion
due to angle contour A73-20255

Random dot pattern luminance and contrast effects
on limiting inter-stimulus interval for visual
apparent motion masking by bright field
A73-20256

Visual sensitivity in the presence of alternating
monochromatic fields of light. A73-21567

VISUAL PERCEPTION

Inter-hemispheric transfer of meaningful visual
information in normal human subjects. A73-20123

Human receptive visual field adaptation
characteristics for stabilized retinal images by
psychophysical probe detection technique A73-20252

Attention field and perception probability
distribution mechanisms of Muller-Lyer illusion
due to angle contour A73-20255

Intrinsic light brightness and intensity
estimation tests for foveal and peripheral
retina under photopic and scotopic stimuli
A73-20257

Neural channel mechanism for real light and
equivalent background coding, using test flashes
under bleaching and field adaptation
A73-20258

Electrical stimulation effects of human eye on
photic threshold for square wave vision as
function of wavelength, orientation and spatial
frequency A73-20260

Threshold variance analysis of monocular vs
binocular visual stimulation in apparent
movement perception A73-20262

The role of colour perception and 'pattern'
recognition in stereopsis. A73-20266

Information processing in the visual system
A73-20374

Contrast and assimilation effects analysis based
on receptive field models of vertebrate retinal
function A73-20812

The brightness of coloured flashes on backgrounds
of various colours and luminances. A73-21565

VISUAL PIGMENTS

Modified rhodopsin in the pigment epithelium.
A73-20263

VISUAL STIMULI

Dynamic properties of vision. III - Twin flashes,
single flashes and flickerfusion. A73-20253

Stimulus effect on spatial summation of color
receptive pathways and discrimination thresholds
as function of color, gradient, retinal
illumination and field size A73-20254

Random dot pattern luminance and contrast effects
on limiting inter-stimulus interval for visual
apparent motion masking by bright field
A73-20256

VISUAL TASKS**SUBJECT INDEX**

Cyclofusional stimulation effects on retinal image disparity in terms of central component and Panum fusional areas A73-20265

Saccadic suppression for structured background as function of visual image pattern and threshold detection elevation in central nervous system A73-20267

Evoked potential correlates of expected stimulus intensity. A73-21225

Psychophysical areal summation and stimulus contour and threshold visibility effects on size selective adaptation in human vision for single- and multichannel models A73-21563

VISUAL TASKS

Autokinetic movement as a function of the implied movement of target shape. A73-19549

Vernier alignment acuity task accuracy related to retinal image line position location, noting effect of high contrast grating background A73-20159

Polarity cue for visual accommodation response of trained subjects to target motion direction change, considering retinal image blur and feedback relation A73-21569

Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem A73-21575

Comparison of human operator critical tracking task performance with aural and visual displays. A73-21667

Study of differences between left and right hand performance in compensatory tracking task [RAE-TB-72117] N73-16098

Concept evaluation and subsystem analyses for design of remote controlled teleoperator visual system [NASA-CR-124059] N73-17117

VOLUMETRIC ANALYSIS

Thermal flowmeter for urine volume measurement in manned space flight environment [NASA-CR-128726] N73-16095

W

WAKEFULNESS

Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness A73-20989

The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. A73-21464

Activity cycle data for spacecrews of Soyuz 3 to 9 spacecrafts before, during and after space flights [JPES-58173] N73-16068

WAKEARE

Evaluation of device to train forward air controllers to communicate target locations [AD-751292] N73-16103

WATER RECLAMATION

Radiation oxidation of water impurities in moisture-containing products of human vital functions N73-16051

WATER TREATMENT

Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984

WEIGHTLESSNESS

Nervous system functional changes due to forces of acceleration and weightlessness [NASA-TT-F-733] N73-17105

Prolonged weightlessness effects on physiological functions of dogs [NASA-TT-F-14672] N73-17110

Weightlessness effects on development of vestibular apparatus and ocular nystagmus in rat, using chronic 2g centrifuge [NASA-CR-114569] N73-17112

WEIGHTLESSNESS SIMULATION

Respiration mechanics during weightlessness simulation in an immersion medium A73-20986

Changes in lung capacity, air passage resistance, and dynamic compliance of humans during water immersion to simulate weightlessness N73-16053

WILDLIFE

Multispectral remote sensing techniques applied to study changes in wildlife habitats N73-16396

WORK CAPACITY

German monograph - Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modulability. A73-20388

Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness A73-20989

WORK-REST CYCLE

Adenonucleotides, NAD+, and NADH in skeletal muscles during intensive work and at rest A73-19475

Industrial model for leave and overtime taking behavior of employees exposed to peak work activity periods in relation to health, demography, and job variables N73-17055

X**X RAY FLUORESCENCE**

X ray fluorescence analysis for determining lead content of paint on pencils in Goddard supply system

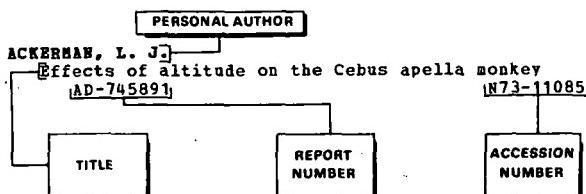
N73-17097

Personal Author Index

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 115)

MAY 1973

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

E.

Y.L.

A

- ABBINK, F.**
A method for chronocyclographical motion analysis with the aid of an on-line computer A73-20036
- ADAMS, A. E.**
Language and brain - Principles, system theories, and their boundaries A73-21425
- ADAMS, D.**
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059] N73-17117
- ADO, A. D.**
The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies A73-19647
- AKAGI, J. S.**
Spin-labeling studies on the membrane of a facultative thermophilic bacillus. A73-20027
- AKHMETOV, K. ZH.**
Diurnal rhythm oscillations of fat metabolism indices in healthy young men A73-19646
- AL-ABBAS, A. H.**
Spectral characteristics of normal and nutrient-deficient maize leaves [NASA-CR-130032] N73-16065
- ALDEE, A. V.**
Human factors evaluation of laser protective visors [AD-751470] N73-16102
- ALEKSEEV, I.**
Random logic nets - Stability and adaptation. A73-20400
- ALEKSEEV, M. A.**
The interaction between muscle groups in a complex motor act in humans A73-21320
- ALEXANDER, R. E.**
Medical examinations for radiation workers N73-17050
- ALEXANDER, S. S.**
Long term clinical relationships of the ventricular premature beat N73-17083
- ALGER, D. L.**
A high yield neutron target for cancer therapy [NASA-TM-X-68179] N73-16067
- ALLEN, R. D.**
Results of the 1971 Corn Blight Watch experiment [NASA-TM-X-69055] N73-16064
- AMALDI, F.**
Base composition of ribosomal RNA and evolution. A73-19220
- ANDERSON, G. L.**
Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169
- ANDREWS, D. P.**
Acuities for spatial arrangement in line figures - Human and ideal observers compared. A73-21564
- ANGIBoust, R.**
Is performance a sufficient index to estimate the effects of stresses on the central nervous system A73-21542
- ARENS, H.**
Pulmonary respiration and acid-base state in hibernating marmots and hamsters. A73-21613
- ARMSTRONG, R. B.**
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- ARNOLD, G.**
Stress recovery of human tendons after relief - Mechanical recovery A73-20033
- ARNOLDI, L. B.**
Leave taking and overtime behavior as related to demographic, health, and job variables N73-17055
- Normally expected aberrations in the 8-hour dynamic EKG N73-17066
- The management of NASA employee health problem; status 1971 N73-17079
- The motivating influence of retest and repeated dietary counseling on cholesterol reduction N73-17081
- The NASA-USPHS health evaluation and enhancement program N73-17091
- ARONOW, W. S.**
Inability of the submaximal treadmill stress test to predict the location of coronary disease. A73-21802
- Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects. A73-21803
- ARTENEMEKO, D. P.**
Participation of hippocampal neurons in theta-wave generation A73-20005
- ASHRAFI, W. L.**
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography. A73-21801
- AVIADO, D. M.**
Cardiopulmonary effects of fluorocarbon compounds [AD-751426] N73-16089
- AZAB, A.**
Cardiovascular effects of fluorocarbon exposure [AD-751427] N73-16091
- B**
- BACK, K. C.**
Dichloromethane hepatotoxicity in mice with continuous and intermittent inhalation exposures [AD-751434] N73-16081

- Effects of monomethylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232] N73-16092
- Special aspects of aviation occupational medicine. Cardiovascular and nervous system effects of bromotrifluoromethane [AGARD-B-599] N73-17106
- BAUBERLE, R. The average information transmitted in the case of multidimensional stimuli involving tactile information transmission A73-20393
- BAGBASH, F. H. Size-selective adaptation - Psychophysical evidence for size-tuning and the effects of stimulus contour and adapting flux. A73-21563
- BABEATSKII, V. H. Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990
- BABEATSKII, V. H. Use of sodium hydrocarbonate as a means for treating and preventing motion sickness N73-16057
- BABER, R. Spectral characteristics of normal and nutrient-deficient maize leaves [NASA-CR-130032] N73-16065
- BABERSKII, I. IA. Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers Balanus rostratus Hock A73-21135
- BARTYZEL', A. I. Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
- BASSANT, M. H. Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
- BAUER, M. E. Results of the 1971 Corn Blight Watch experiment [NASA-TM-X-69055] N73-16064
- BAUMGARDNER, M. F. Spectral characteristics of normal and nutrient-deficient maize leaves [NASA-CR-130032] N73-16065
- BAZAREVICH, G. IA. Mediator systems and respiratory function during an acute lethal loss of blood A73-19645
- BEARD, E. P. An exercise prescription intervention program with periodic ergometric grading N73-17067
- BEAVER, W. L. On-line computer analysis and breath-by-breath graphical display of exercise function tests. A73-21511
- BEDYNIEK, J. L. Sinus venosus atrial septal defect - Analysis of fifty cases. A73-20368
- BEGLEITER, B. Evoked potential correlates of expected stimulus intensity. A73-21225
- BELEDEK, R. V. Analysis of some mechanisms of human stability to decompression of the lower portion of the body A73-20987
- Analysis of some mechanisms of man's tolerance to lower body decompression. N73-16054
- BELKANIYA, G. S. Renal component of the antigravitation function of the organism A73-20976
- BELKANIYA, G. S. Renal component of the antigravitational function in the body N73-16043
- BELLANGEE, G. Renal lithiasis among civil operating aircrew A73-21536
- BELOUSOVA, O. I. Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress A73-19644
- BERGTHOLDT, C. P. Environmental health program activities N73-17057
- BIRD, J. P. Analysis of transient visual sensations above the flicker fusion frequency. A73-21566
- BLACKBURN, L. H. Disorienting effects of aircraft catapult launchings. A73-19480
- BLOUNT, S. G., JR. A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man. A73-20369
- BLUMENFELD, W. Heated Fleisch pneumotachometer - A calibration procedure. A73-21509
- BLUMENSTEIN, B. A mathematical model to assess changes in the baroreceptor reflex. A73-21475
- BOGOSLOVOV, G. B. Pathogenesis of some respiration and circulation reactions to barometric pressure gradients A73-20980
- Pathogenesis of some respiratory and circulatory reactions accompanying drops in barometric pressure N73-16047
- BOLOTASHVILI, Z. A. Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648
- BOONAYATHAP, U. Inhibition of the adrenocortical response to hypoxia by dexamethasone. A73-19476
- BORDA, R. P. The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. A73-21464
- BORISKINA, G. M. Transglucosidase activity of heart-muscle per-glucohydrolase A73-21136
- BORODKIN, P. A. The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture A73-19649
- BOROVIKOV, IU. S. Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers Balanus rostratus Hock A73-21135
- BORBESSEN, C. R. Autokinetic movement as a function of the implied movement of target shape. A73-19549
- BOURLAND, J. D. Linearity of the horizontal component of the electro-oculogram. A73-19125
- BOYD, D. D. Dichloromethane hepatotoxicity in mice with continuous and intermittent inhalation exposures [AD-751434] N73-16081
- BOYER, J. L. Cardiovascular changes in middle-aged men during two years of training. A73-21504
- BOYKIN, E. B. Cinemicrographic study of the development of subsurface colonies of Staphylococcus aureus in soft agar. A73-21828
- BOYLEN, C. W. Survival of Arthrobacter crystallopoitetes during prolonged periods of extreme desiccation. A73-20026

PERSONAL AUTHOR INDEX

COOPER, C. V.

- BEADDICK, O.**
The masking of apparent motion in random-dot patterns. A73-20256
- BRAEGER, D.**
Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise A73-20034
- BRAHLEK, R. E.**
Development of a standardized battery of performance tests for the assessment of noise stress effects [NASA-CR-2149] N73-17102
- BRAUN, H. G.**
Human factors evaluation of laser protective visors [AD-751470] N73-16102
- BRESLAV, I. S.**
Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322
- BRIANOV, I. I.**
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990
- BROADHURST, J. L.**
GPSS/360 computer models to simulate aircraft passenger emergency evacuation [FAA-AM-72-30] N73-17119
- BRODZINSKI, R. L.**
Measurement of radiation exposure of astronauts by radiochemical techniques [NASA-CR-130538] N73-17114
- BROWN, D. B.**
Human receptive field characteristics - Probe analysis of stabilized images. A73-20252
- BROWN, O. B.**
Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria. A73-19483
- BYYANOV, I. I.**
Use of sodium hydrocarbonate as a means for treating and preventing motion sickness N73-16057
- BUCKLEY, B. B.**
Acuities for spatial arrangement in line figures - Human and ideal observers compared. A73-21564
- BURBETT, R. D.**
The industrial hygiene survey [AD-751897] N73-17126
- BUTCHER, A. K.**
Acuities for spatial arrangement in line figures - Human and ideal observers compared. A73-21564
- BYTSKOV, N. V.**
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing biactivity products A73-20984
- Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
- C**
- CALVERT, T. W.**
A model to predict respiration from VCG measurements. A73-20578
- CABL, I.**
The effects of hypoxia and acceleration on enzyme activities in erythrocytes and plasma [DLR-FB-72-71] N73-16070
- CARRIB, J. B. G.**
The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. A73-21464
- CARTEE, J. E. L.**
Cardiovascular changes in middle-aged men during two years of training. A73-21504
- CHAGOVETS, N. R.**
Adenonucleotides, NAD+, and NADH in skeletal muscles during intensive work and at rest A73-19475
- CHAMBERLIN, R. I.**
Laboratory hood design N73-17063
- CHAN, M.**
Spin-labeling studies on the membrane of a facultative thermophilic bacillus. A73-20027
- CHAPLAN, R. D.**
Psychosocial factors in coronary heart disease N73-17054
- CHATO, J. C.**
Thermal protective garment using independent regional control of coolant temperature. A73-19481
- CHEITLIN, M. D.**
Sinus venosus atrial septal defect - Analysis of fifty cases. A73-20368
- CHERNIAKOV, I. N.**
Tissue oxygen in the presence of extremal flight factors A73-19425
- CHERNOGRADSKAYA, N. A.**
Application of the method of polarization ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Hock A73-21135
- CHIA-KIANG, S.**
Analysis of electrocardiograms of Rhesus monkeys (*Macaca mulatta*) [NASA-TT-F-14675] N73-16062
- CHIANG, C.**
A theory of the Mueller-Lyer illusion. A73-20255
- CHILAIKA, S. M.**
Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648
- CHIZHOV, S. V.**
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing biactivity products A73-20984
- Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
- CHOBOTAS, M. A.**
Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress A73-19643
- CLARK, D. L.**
Effects of weightlessness on the development of the vestibular apparatus and ocular nystagmus in the rat [NASA-CR-114569] N73-17112
- CLIFTON, J. W.**
Results of the 1971 Corn Blight Watch experiment [NASA-TM-X-69055] N73-16064
- COBB, J.**
A projected grid method for recording the shape of the human face [RAE-TR-71184] N73-16099
- COHEN, M. H.**
Disorienting effects of aircraft catapult launchings. A73-19480
- COLLEY, I. A.**
Predictive modeling of altitude decompression sickness in humans [NASA-CR-114550] N73-16066
- COOK, E. A.**
GPSS/360 computer models to simulate aircraft passenger emergency evacuation [FAA-AM-72-30] N73-17119
- COOPER, C. V.**
The toxicity of pyrolysis products from a chlorotrifluoroethylene-ethylene copolymer (Balair resin) [AD-751436] N73-16080

CORBIN, M. J.
Human operators and automatic adaptive controllers - A comparative study on a particular control task. A73-20399

CORDES, W. P., III
Plastic materials for eye protection from lasers [AD-752594] N73-17127

CORNSWEET, T. H.
Training the visual accommodation system. A73-21569

COSGROVE, M. P.
Human receptive field characteristics - Probe analysis of stabilized images. A73-20252

COUET, L.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540

CRABBE, F. L.
Spectral characteristics of normal and nutrient-deficient maize leaves [NASA-CR-130032] N73-16065

CRABBE, H. D.
Training the visual accommodation system. A73-21569

CRIBBIN, C.
Correlation between man and mouse in respect of physical activity and oxygen consumption [FOA-1-E-1233-A5] N73-17108

CROSbie, R. J.
Disorienting effects of aircraft catapult launchings. A73-19480

CUMMING, G.
Effects of lung volume and disease on the lung nitrogen decay curve. A73-21501

A model of time-varying gas exchange in the human lung during a respiratory cycle at rest. A73-21615

D

DADIAMI, A. N.
Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648

DANIELSON, J. T.
In search of the neural channel which codes real light and equivalent backgrounds. A73-20258

DARMBER, K. I., JR.
The acute toxicity of chlorine pentafluoride [AD-751452] N73-16078

DARNELL, W. L.
Cinemicrographic study of the development of subsurface colonies of *Staphylococcus aureus* in soft agar. A73-21828

DAVIA, J. E.
Sinus venosus atrial septal defect - Analysis of fifty cases. A73-20368

DAVIS, H. V.
The acute toxicity of brief exposures to hydrogen fluoride, hydrogen chloride, nitrogen dioxide, and hydrogen cyanide singly and in combination with carbon monoxide [AD-751442] N73-16085

DE VALOIS, R. L.
Single cell analysis of saturation discrimination in the macaque. A73-21568

DECKER, A. I.
Stress studies at Kennedy Space Center: A backward and forward look N73-17082

DELAHAYE, B. P.
Cosmic radiation and research carried out on board the 001 prototype Concorde A73-19211

DELISSEB, S. P.
Impact of NASA stress laboratory program on US colleges N73-17092

DESAI, D.
Long term clinical relationships of the ventricular premature beat N73-17083

DIPASQUALE, L. C.
The acute toxicity of brief exposures to hydrogen fluoride, hydrogen chloride, nitrogen dioxide, and hydrogen cyanide singly and in combination with carbon monoxide [AD-751442] N73-16085

DNEPROVSKA, T. P.
Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents A73-20003

DRANE, J. W.
A mathematical model to assess changes in the baroreceptor reflex. A73-21475

DUCROS, H.
The consequences of partial inanition in hot climates A73-21248

DUFOUR, D.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540

DURBECK, D. C.
Personal benefits of a health evaluation and enhancement program N73-17069

The NASA-USPHS health evaluation and enhancement program N73-17091

DURNEY, B. R.
Cosmic radiation and research carried out on board the 001 prototype Concorde A73-19211

E

EHSANI, A. A.
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography. A73-21801

EL-SHERIF, N.
Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches. A73-19152

ELSER, B.
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. A73-19932

ELKINS, W.
High pressure space suit glove [NASA-CR-114535] N73-17120

ELLESTAD, M. H.
Inability of the submaximal treadmill stress test to predict the location of coronary disease. A73-21802

ELLIS, J. P., JR.
Human endocrine-metabolic responses to graded oxygen pressures. A73-19479

ESTENMAN, C.
Effect of low temperature on metabolism of rat liver slices and epididymal fat pads. A73-20170

EPSTEIN, E. L.
Effect of some pharmacological preparations on the fall-out nystagmus and Bechterew nystagmus A73-20982

EPSTEIN, Y. L.
Effect of some drugs on fall-out and Bechterew nystagmus N73-16049

EPSTEIN, M.
Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. A73-21503

EVERING, F. C., JR.
Modulated light transmission for electrical isolation in a multichannel physiological monitoring system. A73-19482

EVERY, M. G.
Habitability issues in long duration undersea and space missions [NASA-CR-130537] N73-17123

F

FANI, K.
Intravascular platelet aggregation in the heart induced by stress. A73-21805

FARBER, F. H.
An investigation of a sterile access technique for the repair and adjustment of sterile spacecraft [NASA-TN-D-7147] N73-17122

FAVORITE, F. G.
Guides for short-term exposures of the public to air pollutants [AD-751438] N73-16084
Basis for establishing guides for short term exposure of the public to air pollutants [AD-751437] N73-16088

FEDOROV, I. S.
Problems of man's interaction with his natural environment [JPRS-58113] N73-17121

FEDOROVA, N. L.
Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation A73-20981

Morphological changes in the testes of dogs accompanying chronic and combined gamma irradiation N73-16048

FELTON, J. S.
Sensitivity to emotional ill health N73-17062

FINDLAY, J. B.
Feature detectors and vernier acuity. A73-20159

FINLEY, D. L.
Training effectiveness evaluation of naval training devices. Part 1: A study of the effectiveness of a carrier air traffic control center training device [AD-751556] N73-16101

PIORENTINI, C.
Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015

FISCH, C.
Relation of electrolyte disturbances to cardiac arrhythmias. A73-21807

FLECK, R. L.
Dynamic ERG study N73-17065
Normally expected aberrations in the 8-hour dynamic EKG N73-17066

Coronary risk factor scoring as a guide for counseling N73-17080

FOLKE, B. D.
GPSS/360 computer models to simulate aircraft passenger emergency evacuation [FAA-AM-72-30] N73-17119

FORGAYS, D. G.
Modulated light transmission for electrical isolation in a multichannel physiological monitoring system. A73-19482

FOSTER, T. L.
A study of psychrophilic organisms isolated from the manufacture and assembly areas of spacecraft to be used in the Viking mission [NASA-CR-130009] N73-16059

FOU, S. B., III
The NASA-GSPHS health evaluation and enhancement program N73-17091

FRANCOIS, A.
Cosmic radiation and research carried out on board the 001 prototype Concorde A73-19211

FREEMAN, B. D.
Meridional amblyopia - Evidence for modification of the human visual system by early visual experience. A73-21562

FRENCH, J. R. P., JR.
Psychosocial factors in coronary heart disease N73-17054

FREUND, B.
On table salt fever [NASA-TT-P-14677] N73-16063

FRICKSON, J. D.
Results of the 1971 Corn Blight Watch experiment [NASA-TN-X-69055] N73-16064

FRIEDMAN, S. M.
An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510

FROST, J. D., JR.
The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. A73-21464

FULGHAM, D. D.
Human receptive field characteristics - Probe analysis of stabilized images. A73-20252

FULLER, B. V.
An investigation of a sterile access technique for the repair and adjustment of sterile spacecraft [NASA-TN-D-7147] N73-17122

G

GAPFROH, H.
Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria. A73-21685

GARCIA-ARCE, H.
Mitotic activity in dorsal epidermis of Rana pipiens. A73-20456

GARNIER, J. D.
GPSS/360 computer models to simulate aircraft passenger emergency evacuation [FAA-AM-72-30] N73-17119

GEBERT, G.
An implantable glass electrode used for pH measurement in working skeletal muscle. A73-21510

GEDDES, L. A.
Linearity of the horizontal component of the electro-oculogram. A73-19125

GEORGE, M. B.
Effects of monomethylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232] N73-16092

GEORGIEVSKII, V. S.
Vertical posture control after Soyuz 6, 7 and 8 flights and 120-day hypokinesia A73-20985

GEORGIEVSKII, V. S.
Regulation of vertical posture after flight on the Soyuz-6 - Soyuz-8 ships and 120 day hypokinesia N73-16052

GILSON, B. D.
Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn. A73-19485

GLASS, B. A.
Visual sensitivity in the presence of alternating monochromatic fields of light. A73-21567

GLAZ, O. B.
Application of the perceptron to the classification of objects according to random features A73-20047

- GOL'DSBTEIN, M. M.
The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies A73-19647
- GOLDSTONE, J.
Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta. A73-21199
- GÖLLNICK, P. D.
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- GOMZAKOV, O. A.
Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151
- GONDZHILASHVILI, IA. I.
Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning A73-19648
- GORIZONTOV, P. D.
Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress A73-19644
- GORLINS, R.
Assessment of hypoxia in the human heart. A73-19928
- Ventriculographic patterns and hemodynamics in primary myocardial disease. A73-21804
- GORMLEY, W. T.
Effects of monomethylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232] N73-16092
- GRANT, C.
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059] N73-17117
- GRAY, L. B.
Lead pencils N73-17097
- GREENLEAF, J. E.
Changes in total plasma content of electrolytes and proteins with maximal exercise. A73-21507
- GRIFFIN, S. J.
The transmission of triaxial vibration to pilots in the Scout AH MkI helicopter [ISVR-TB-58] N73-16100
- GRIMAK, L.
Emotional stresses during a space flight A73-19297
- Emotional stress during spaceflight [JPRS-58039] N73-17104
- GUAZZI, M.
Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015
- GUDBJARNASON, S.
The use of glycolytic metabolism in the assessment of hypoxia in human hearts. A73-19929
- GUEDEY, F. E., JR.
Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn. A73-19485
- GUETH, V.
A method for chronocyclographical motion analysis with the aid of an on-line computer A73-20036
- GUIGUARD, J. C.
Aeromedical aspects of vibration and noise [AGAROGRAPH-151] N73-17098
Vibration N73-17099
Noise N73-17100
- GULIBVA, S. A.
A method for electrocardiogram recording in Rhesus monkeys A73-21324
- GULLSTT, C. C.
Flight crew health maintenance N73-17076
- GUBOVSKIY, N. N.
Physiological problems of prolonged weightlessness [NASA-TT-F-14672] N73-17110
- H
- HAAS, W.
Calorimetric investigation of enzymes. Thermodynamic parameter determination of the interaction between ribonuclease T1 inhibitors and substrates [BMVG-PBWT-72-12] N73-16073
- Nuclear resonance investigation of enzymes. PMR spectra of ribonuclease inhibitor complexes [BMVG-PBWT-72-13] N73-16074
- HABERMEYER, J. G.
Machining of low percentage beryllium copper alloys N73-17059
- HAEGERSTROM, G.
Meridional amblyopia - Evidence for modification of the human visual system by early visual experience. A73-21562
- HAFT, J. I.
Intravascular platelet aggregation in the heart induced by stress. A73-21805
- HAKIM, A. A.
Action of a serum protein on muscular contraction. A73-21200
- HALCOMB, C. G.
Individual differences as a function of four choice informational load and s-r compatibility [AD-752073] N73-17115
- HALE, B. B.
Human endocrine-metabolic responses to graded oxygen pressures. A73-19479
- HALL, J. D.
Spectral characteristics of normal and nutrient-deficient maize leaves [NASA-CR-130032] N73-16065
- HALL, R. J.
Pupilometry using an advanced-design oculometer [AD-752121] N73-17116
- HAMILTON, R. W., JR.
Predictive modeling of altitude decompression sickness in humans [NASA-CR-114550] N73-16066
- HANUSOVA, V.
A respirometer for the continuous measurement of respiration volume with remote transmission A73-20035
- HARENSCHEGER, G.
Photosensitized inhibitor formation in isolated, aging chloroplasts. A73-20453
- HARPER, C. B.
Civil aviation medicine in the coming decade. A73-19484
- HARRIS, C. H.
Inability of the submaximal treadmill stress test to predict the location of coronary disease. A73-21802
- HARRIS, W. S.
Cardiac toxicity of aerosol propellants [AD-751425] N73-16090
- HARRISON, D. B.
Method for measuring the contractions of small hearts in organ culture. A73-21218
- HARRISON, J. M.
The probabilistic structure of planetary contamination models [NASA-CR-130558] N73-17103
- HARTLEY, L. H.
Central, femoral, and brachial circulation during exercise in hypoxia. A73-21506
- HAUN, C. C.
Chronic exposure studies with monomethylhydrazine [AD-751440] N73-16087

PERSONAL AUTHOR INDEX

KAPLAN, M. A.

- HABEL, W.
Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem
A73-21575
- HEBBICHES, W.
A method for chronocyclographical motion analysis with the aid of an on-line computer
A73-20036
- HEINZELMANN, F.
Personal benefits of a health evaluation and enhancement program
N73-17069
- The NASA-USPHS health evaluation and enhancement program
N73-17091
- HEBMAN, M. V.
Ventriculographic patterns and hemodynamics in primary myocardial disease.
A73-21804
- HEBSHBERG, P. I.
Programmed multiphasic health testing
N73-17074
- Long term clinical relationships of the ventricular premature beat
N73-17083
- HEBTIG, B. A.
Thermal protective garment using independent regional control of coolant temperature.
A73-19481
- HESS, B. A.
The use of a linear rating scale in selecting a subcritical tracking task parameter [AD-752036]
N73-17125
- HILL, A. B.
Monocular and binocular aspects of apparent movement.
A73-20262
- HILL, D. W.
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms.
A73-19124
- HILL, I. W.
Quantitation of buried contamination by use of solvents [NASA-CR-130720]
N73-17111
- HILLIS, P.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant
A73-21540
- HILLYARD, L. A.
Effect of low temperature on metabolism of rat liver slices and epididymal fat pads.
A73-20170
- HIMES, R. H.
Spin-labeling studies on the membrane of a facultative thermophilic bacillus.
A73-20027
- HIPSKIND, S. G.
Changes in total plasma content of electrolytes and proteins with maximal exercise.
A73-21507
- HIKOS, W. C.
Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn.
A73-19485
- HLASTALA, M. P.
Significance of the Bohr and Haldane effects in the pulmonary capillary.
A73-21614
- HOCHSTEIN, L. I.
Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria.
A73-19500
- HOPPMAN, A. B.
Experience factors in performing periodic physical evaluations
N73-17052
- HOLLABAN, J. B.
Synthesis of reverse osmosis membranes by plasma polymerization of allylamine.
A73-19169
- HOLMQUIST, R.
Sequence data - Magnitude and implications of some ambiguities.
A73-19218
- HOLOCH, J.
Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram
A73-20391
- HSIAO, P.
Quantitation of buried contamination by use of solvents [NASA-CR-130720]
N73-17111
- HUESCHEN, R. M.
An investigation of a sterile access technique for the repair and adjustment of sterile spacecraft [NASA-TN-D-7147]
N73-17122
- HURDATO, A.
The influence of altitude on man
A73-19212
- HYATT, R. E.
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man.
A73-21505
- IAKIMOV, N.
Saccadic suppression in the presence of structured background.
A73-20267
- IAKOVLEV, N. M.
Ontogenesis of cerebrospinal reflex activity
A73-20366
- ILLE, J.
Valvular cardiopathies and tolerance to flight
A73-19209
- IOANNIDIS, E. J.
Orthogonal versus planar vector-electrocardiography.
A73-19930
- IOANNIDIS, P. J.
Orthogonal versus planar vector-electrocardiography.
A73-19930
- J
- JAMES, T. H.
Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/
A73-21806
- JOHNSON, C.
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059]
N73-17117
- JOHNSTON, J. B.
Application of remote sensing techniques for appraising changes in wildlife habitat
N73-16396
- JONES, B.
Two dimensional eye movement recording using a photo-electric matrix method.
A73-20259
- JUKES, T. H.
Sequence data - Magnitude and implications of some ambiguities.
A73-19218
- K
- KAISER, R.
Cosmic radiation and research carried out on board the 001 prototype Concorde
A73-19211
- KAKURIN, L. I.
Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia
A73-20985
- Regulation of vertical posture after flight on the Soyuz-6 - Soyuz-8 ships and 120 day hypokinesia
N73-16052
- KAPELKOV, V. I.
The contractile function of the myocardium in two types of cardiac adaptation to a chronic load.
A73-19931
- KAPLAN, M. A.
Inability of the submaximal treadmill stress test to predict the location of coronary disease.
A73-21802

- KARLINEER, J. S.
Left ventricular performance after myocardial infarction assessed by radioisotope angiography. A73-21801
- KASCH, F. W.
Cardiovascular changes in middle-aged men during two years of training. A73-21504
- KASPEBOVICH, A. N.
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984
- Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
- KEABBS, H. H.
Evaluation of a device to train forward air controllers to communicate target locations [AD-751292] N73-16103
- KELLAWAY, P.
The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. A73-21464
- KENT, B. B.
A mathematical model to assess changes in the baroreceptor reflex. A73-21475
- KEBYON, D. J.
Predictive modeling of altitude decompression sickness in humans [NASA-CR-114550] N73-16066
- KERTESZ, A. E.
Central component of fusional response - The effect of stimulus parameters. A73-20265
- KHACHATURIANTS, L.
Emotional stresses during a space flight A73-19297
- KHACHATURIANTS, L.
Emotional stress during spaceflight [JPRS-58039] N73-17104
- KHAZUTIN, V. N.
Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
- KIDD, B. S. L.
Time course of pulmonary vascular response to hypoxia in dogs. A73-20168
- KING, P. P.
Aeromedical aspects of vibration and noise [AGABDOGRAPH-151] N73-17098
- Hearing conservation in aircrew and ground support personnel N73-17101
- KISELEV, A. A.
Physiological problems of prolonged weightlessness [NASA-TT-F-14672] N73-17110
- KISSIMM, B.
Evoked potential correlates of expected stimulus intensity. A73-21225
- KLEINMAN, D. L.
Current status of models for the human operator as a controller and decision maker in manned aerospace systems. A73-20587
- KLEINMAN, K. H.
Inter-hemispheric transfer of meaningful visual information in normal human subjects. A73-20123
- KLETT, A. T.
Application of remote sensing techniques for appraising changes in wildlife habitat N73-16396
- KLINGER, E.-P.
The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials A73-20389
- KOLESHNIKOV, A. K.
Mediator systems and respiratory function during an acute lethal loss of blood A73-19645
- KOMAROVA, D. P.
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990
- Use of sodium hydrocarbonate as a means for treating and preventing motion sickness N73-16057
- KOSENDANTOV, G. L.
Problem of acceleration in aviation medicine. Part 3: Functional changes in the nervous system during G-loads and weightlessness [NASA-TT-F-733] N73-17105
- KOROL'KOV, V. I.
Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability A73-20988
- KOBOLKOV, V. I.
Effect of a gas mixture with an increased oxygen and carbon dioxide content on man's orthostatic tolerance N73-16055
- KOSTIUKOV, A. I.
Corticoid and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculus of the cat spinal cord A73-20002
- KOSTUK, W. J.
Left ventricular performance after myocardial infarction assessed by radioisotope angiography. A73-21801
- KOUKOL, R. C.
Microbiological sampling of spacecraft cabling, antennas, solar panels and thermal blankets [NASA-CB-130383] N73-17109
- KOVALIEKO, E. A.
Tissue oxygen in the presence of extremal flight factors A73-19425
- KRASHOSHCHEKOV, V. V.
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984
- Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
- KREIPELDT, J. G.
Pilot performance during a simulated standard instrument procedure turn with and without a predictor display [NASA-TM-X-62201] N73-17118
- KREULEB, T. H.
Ventriculographic patterns and hemodynamics in primary myocardial disease. A73-21804
- KROE, D. J.
Animal pathology resulting from long term exposure to low levels of monomethylhydrazine [AD-751441] N73-16086
- KRUEGER, H.
On the approximation of the optical modulation transfer function /MTF/ by analytical functions. A73-20264
- KURCHLER, G.
Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise A73-20034
- KUSHNER-CLAUSEN, D.
Pharmacological investigation of the parasympatholytic effect of mono and bisquaternary pyridinium compounds on the isolated guinea pig ileum [BBVG-PBWT-72-14] N73-16075
- KUPEL, E. E.
The toxicity of pyrolysis products from a chlorotrifluoroethylene-ethylene copolymer (Halar resin) [AD-751436] N73-16080
- KURIOKA, Y.
Analysis of contrast and assimilation effects on the basis of receptive field models. A73-20812
- KUZNETSOV, A. G.
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990

PERSONAL AUTHOR INDEX

MASTER, R. L.

- Use of sodium hydrocarbonate as a means for treating and preventing motion sickness N73-16057
- L**
- LA POSTA, A.
Base composition of ribosomal RNA and evolution. A73-19220
- LAGET, P.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
- LAMBERT, R. E.
A model for the elastic properties of the lung and their effect on expiratory flow. A73-21502
- LANDGRENBE, D. H.
Results of the 1971 Corn Blight Watch experiment [NASA-TM-X-69055] N73-16064
- LANDOWNE, H.
Central, femoral, and brachial circulation during exercise in hypoxia. A73-21506
- LAUTSEVICHEUS, L. Z.
Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress A73-19643
- LAVA-SANCHEZ, P. A.
Base composition of ribosomal RNA and evolution. A73-19220
- LAZEBIEV, I. L.
Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem A73-19650
- LECHEVALLIER, C.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
- LEGUAY, G.
Valvular cardiopathies and tolerance to flight A73-19209
- Renal lithiasis among military operating aircrew A73-21537
- Proteinuria and military aircrew A73-21539
- LEKOS, D.
Orthogonal versus planar vector-electrocardiography. A73-19930
- LEONARDSON, B. O.
Preliminary report on use of Lahey clinic automated history in an industrial complex N73-17060
- LIKHTENSHTEIN, A. O.
Mediator systems and respiratory function during an acute lethal loss of blood A73-19645
- LIMONCELLI, D. D.
The NASA-USPHS health evaluation and enhancement program N73-17091
- LIN, K. H.
A model of time-varying gas exchange in the human lung during a respiratory cycle at rest. A73-21615
- LINDQUIST, V. A. Y.
A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man. A73-20369
- LIPAHIA, J. G.
An operating environmental health program N73-17093
- LIPPEBT, H.
Stress recovery of human tendons after relief - Mechanical recovery A73-20033
- LITSOV, A. I.
Rhythms of sleep and wakefulness in crews of the spaceships Soyuz 3-9 before, during and after exposure to spaceflight [JPRS-58173] N73-16068
- LITTLE, L. J.
The design of analysis of a human body motion measurement system [AD-751134] N73-16104

- LITTLE, B. W.
Inter-hemispheric transfer of meaningful visual information in normal human subjects. A73-20123
- LOGINOVA, N. K.
Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute A73-21325
- LUNEV, I. IA.
Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability A73-20988
- LUNEV, I. Y.
Effect of a gas mixture with an increased oxygen and carbon dioxide content on man's orthostatic tolerance N73-16055
- M**
- MACDONALD, R. B.
Results of the 1971 Corn Blight Watch experiment [NASA-TM-X-69055] N73-16064
- MACEWEN, J. D.
Chronic exposure studies with monomethylhydrazine [AD-751440] N73-16087
- MACKEEBZIB, W. F.
Pathological lesions caused by methylisobutylketone [AD-751444] N73-16083
- MADHUSUDHAN RAO, V.
The role of colour perception and 'pattern' recognition in stereopsis. A73-20266
- MAGRINI, F.
Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015
- MAIDON, B.
Protective clothing for fueling personnel A73-18949
- MAKUL'KIN, B. F.
Physiological mechanisms of evoked-potential habituation in the visual analyzer A73-20006
- MALAN, A.
Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms. A73-21612
- Pulmonary respiration and acid-base state in hibernating marmots and hamsters. A73-21613
- MALASANOS, L. J.
Inhibition of the adrenocortical response to hypoxia by dexamethasone. A73-19476
- MALIK, A. B.
Time course of pulmonary vascular response to hypoxia in dogs. A73-20168
- MANNING, J. W.
A mathematical model to assess changes in the baroreceptor reflex. A73-21475
- MARKS, L. E.
Brightness and equivalent intensity of intrinsic light. A73-20257
- MAROTTA, S. F.
Inhibition of the adrenocortical response to hypoxia by dexamethasone. A73-19476
- MAREAZZO, R. B.
Environmental health program in NASA N73-17056
- MARROCCO, R. T.
Single cell analysis of saturation discrimination in the macaque. A73-21568
- MASLEN, G. V.
Mediator systems and respiratory function during an acute lethal loss of blood A73-19645
- MASTERSBROOK, S. M., JR.
Noninvasive measurement of central venous pressure [NASA-CR-130348] N73-16039
- MASTERS, R. L.
An operating environmental health program N73-17093

- HATEEV, S.**
Saccadic suppression in the presence of structured background.
A73-20267
- HATLINA, B. SH.**
Catecholamine exchange in the hormonal and mediator links of the sympathoadrenal system under stress
A73-20367
- HAUBER, G.**
Calorimetric investigation of enzymes.
Thermodynamic parameter determination of the interaction between ribonuclease T1 inhibitors and substrates
[PMVG-PFWT-72-12] N73-16073
Nuclear resonance investigation of enzymes. PMR spectra of ribonuclease inhibitor complexes
[BMVG-PFWT-72-13] N73-16074
- HAY, J. G.**
The effects of electrical stimulation of the eye upon increment threshold for square-wave gratings.
A73-20260
- HCCLOUE, G.**
Modulated light transmission for electrical isolation in a multichannel physiological monitoring system.
A73-19482
- MCLBOD, P.**
Response strategies with a cross-coupled control system.
A73-19548
- HEERSON, F. Z.**
Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis.
A73-19151
- The contractile function of the myocardium in two types of cardiac adaptation to a chronic load.
A73-19931
- HEIERICK, R.**
Conceptual design study for a teleoperator visual system, phase 1
[NASA-CR-124059] N73-17117
- HESECHERSKII, B. L.**
Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute
A73-21325
- HEKELADEZ, A. I.**
Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem
A73-19650
- HEKHAILOV, V. S.**
Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia
A73-20985
- HEKHAILOV, V. S.**
Regulation of vertical posture after flight on the Soyuz-6 - Soyuz-8 ships and 120 day hypokinesia
N73-16052
- HILHOBB, H. T., JR.**
Digital computer studies of respiratory control.
A73-20577
- HILLODOT, M.**
Meridional amblyopia - Evidence for modification of the human visual system by early visual experience.
A73-21562
- HILLS, S. H.**
Apparatus for microbiological sampling
[NASA-CASE-LAR-11069-1] N73-16061
Automatic inoculating apparatus
[NASA-CASE-LAR-11074-1] N73-16096
- HIRABELLA, A.**
Development of a standardized battery of performance tests for the assessment of noise stress effects
[NASA-CR-2149] N73-17102
- HISREHENKO, V. I.**
Effect of heparin on blood platelet aggregation and thrombosis under the action of direct electric current
A73-21321
- HITCHELL, D. E.**
Meridional amblyopia - Evidence for modification of the human visual system by early visual experience.
A73-21562
- HITEANI, L.**
Saccadic suppression in the presence of structured background.
A73-20267
- HIZELL, S.**
Mitotic activity in dorsal epidermis of Rana pipiens.
A73-20456
- HOCELLINI, R.**
Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem
A73-21575
- MOCKBEE, J.**
The value of continued followup in a preventive medicine program
N73-17072
- The management of chronic disease: A study of employee morbidity and mortality at the NASA, Goddard Space Flight Center, 1966 - 1971
N73-17086
- MOLTON, P. M.**
Survival of micro-organisms on the moon.
A73-19111
- MORONEY, W. P.**
Empirical reduction in potential user population as the result of imposed multivariate anthropometric limits
[AD-752032] N73-17124
- MOSER, E. A.**
On the approximation of the optical modulation transfer function /MTF/ by analytical functions.
A73-20264
- MOTSNEYI, P. B.**
Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents
A73-20003
- MOURITSEN, G.**
A urine volume measurement system
[NASA-CR-128726] N73-16095
- HOWRAY, G. H.**
Analysis of transient visual sensations above the flicker fusion frequency.
A73-21566
- MOXLEY, R. T., III**
The NASA-USPHS health evaluation and enhancement program
N73-17091
- MU-CHEW, Y.**
Analysis of electrocardiograms of Rhesus monkeys (Macaca mulatta)
[NASA-TT-F-14675] N73-16062
- MUSACCHIA, I. J.**
Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites.
A73-20169
- The role of depressed metabolism in increased radio resistance
[NASA-CR-130381] N73-16038
- N**
- NAIDEL', A. V.**
The interaction between muscle groups in a complex motor act in humans
A73-21320
- MARINSKAIA, A. L.**
Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness
A73-20989
- MARINSKAYA, A. L.**
Diurnal dynamics of psychic performance during 72 hour continuous wakefulness
N73-16056
- NELSON, H. K.**
Application of remote sensing techniques for appraising changes in wildlife habitat
N73-16396
- BEZLINA, E. I.**
Changes in the amplitudinal and temporal characteristics of sensorimotor-cortex evoked potentials after deactivation of spinocervical tracts in cats
A73-20004

PERSONAL AUTHOR INDEX

PLOTHIKOVA, V. P.

- NIELSEN, J. S.**
Annual report for 1971 to the USAEC Division of Biology and Medicine. Volume 2: Physical sciences. Part 2: Radiological sciences [BNWL-1651-VOL-2-PT-2] N73-16069
- BIVEN, J. I.**
Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn. A73-19485
- BORTE, W. D.**
The probabilistic structure of planetary contamination models [NASA-CR-130558] N73-17103
- BOVIR, I. B.**
Problems of man's interaction with his natural environment [JPRS-58113] N73-17121
- BOWLES, D. P.**
Tekrite, 2 habitability research program: Day-to-day life in the habitat [NASA-CR-130034] N73-16094
- O**
- OESEBURG, B.**
Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter. A73-21217
- OGORODNIK, V. V.**
Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents A73-20003
- OLDIGES, H.**
Antidotes for alkyl phosphate poisoning: Structure-effect relations in vivo and in vitro [BMVG-FBWT-72-8] N73-16072
- OTTO, F. J.**
Biological effects of fast neutrons. Mortality and changes in blood cell count of mice after complete exposure to fast neutrons and x-rays [BMVG-FBWT-72-16] N73-16077
- OWENS, C. A.**
An exercise prescription intervention program with periodic ergometric grading. N73-17067
- OWENS, J. B.**
Individual differences as a function of four choice informational load and s-r compatibility [AD-752073] N73-17115
- P**
- PANKOVA, A. S.**
Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours A73-20978
- Morphological changes in the juxtaglomerular apparatus in the kidneys of rats during multihour exposure to accelerations in different directions N73-16045
- PANNIER, B.**
Valvular cardiopathies and tolerance to flight A73-19209
- Renal lithiasis among military operating aircrew A73-21537
- Proteinuria and military aircrew A73-21539
- Antidiabetic medications and aircrew A73-21541
- PAPPAS, S. P.**
Quantitation of buried contamination by use of solvents [NASA-CR-130570] N73-17111
- PARKER, D. P.**
Inability of the submaximal treadmill stress test to predict the location of coronary disease. A73-21802
- PARKER, J. P., JR.**
Habitability issues in long duration undersea and space missions [NASA-CR-130537] N73-17123
- PATE, T.**
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radio-cardiograms. A73-19124
- PAVLOV, V. V.**
An ergotic organism A73-20048
- PAYNE, G. H.**
The NASA-USPHS health evaluation and enhancement program N73-17091
- PEDANOV, IU. P.**
Physiological mechanisms of evoked-potential habituation in the visual analyzer A73-20006
- PEQUIGNOT, H.**
Proteinuria and civil aviation aircrew A73-21538
- PETERSON, D.**
Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria. A73-19483
- PETERSON, K. L.**
Left ventricular performance after myocardial infarction assessed by radioisotope angiography. A73-21801
- PETROPSKY, J. S.**
Changes in total plasma content of electrolytes and proteins with maximal exercise. A73-21507
- PETUKHOV, B. B.**
Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia A73-20985
- Regulation of vertical posture after flight on the Soyuz-6 - Soyuz-8 ships and 120 day hypokinesia N73-16052
- PHATAK, A. V.**
Current status of models for the human operator as a controller and decision maker in manned aerospace systems. A73-20587
- PHILLIPS, W. H.**
Cardiovascular changes in middle-aged men during two years of training. A73-21504
- PIERCE, F. G.**
Infrasound N73-17085
- PIGOTT, V. M.**
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. A73-19932
- PILIAVSKII, A. I.**
Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculi of the cat spinal cord A73-20002
- PINKERTON, M. K.**
Effects of methylene chloride exposure on the spontaneous activity of mice [AD-751435] N73-16082
- PITKIN, E. T.**
Comparison of human operator critical tracking task performance with aural and visual displays. A73-21667
- PLAKHUTA-PLAKUTINA, G. I.**
Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation A73-20981
- Morphological changes in the testes of dogs accompanying chronic and combined gamma irradiation N73-16048
- PLOTHIKOVA, V. P.**
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984
- Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051

POLESE, A.
Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension. A73-21015

POLESCHUK, A. T.
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990

Use of sodium hydrocarbonate as a means for treating and preventing motion sickness B73-16057

POLHEMUS, C.
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059] B73-17117

POPENDIEK, H. F.
A urine volume measurement system [NASA-CR-128726] B73-16095

PORJESZ, B.
Evoked potential correlates of expected stimulus intensity. A73-21225

PORTAL, H.
Cosmic radiation and research carried out on board the 001 prototype Concorde A73-19211

PROKSH, K.
Effects of lung volume and disease on the lung nitrogen decay curve. A73-21501

PUBAKHIN, Iu. N.
Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia A73-20985

PUBAKHIN, I. N.
Regulation of vertical posture after flight on the Soyuz-6 - Soyuz-8 ships and 120 day hypokinesia B73-16052

R

BANACHANDRAN, V. S.
The role of colour perception and 'pattern' recognition in stereopsis. A73-20266

BASTRIGIN, L. A.
Application of the perceptron to the classification of objects according to random features A73-20047

BAY, A.
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059] B73-17117

BAYHAUD, G.
An instrument panel on an image tube in color A73-21543

BEARDON, W. C.
Method for measuring the contractions of small hearts in organ culture. A73-21218

BEED, J. P.
Morphometric and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215

BEHDEB, K.
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. A73-21505

BEMTSCHLER, I.
Spatial summation in color-receptive pathways. A73-20254

BESCH, G. E.
Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites. A73-20169

REYNOLDS, W. J.
Digital computer studies of respiratory control. A73-20577

RHEINLAENDER, T. W.
Training effectiveness evaluation of naval training devices. Part 1: A study of the effectiveness of a carrier air traffic control center training device [AD-751556] B73-16101

RICHARDS, D. E.
The toxicity of pyrolysis products from a chlorotrifluoroethylene-ethylene copolymer (Halar resin) [AD-751436] B73-16080

RITTENHOUSE, D.
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059] B73-17117

ROBB, T. R.
Seat reaction direction in an animal centrifuge. A73-19478

ROBERTSON, A. B.
The toxicity of pyrolysis products from a chlorotrifluoroethylene-ethylene copolymer (Halar resin) [AD-751436] B73-16080

ROSINSKI, L. B.
Guides for short-term exposures of the public to air pollutants [AD-751438] B73-16084

Basis for establishing guides for short term exposure of the public to air pollutants [AD-751437] B73-16088

ROSS, J., JR.
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiology. A73-21801

ROUFS, J. A. J.
Dynamic properties of vision. III - Twin flashes, single flashes and flickerfusion. A73-20253

ROUIF, G.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540

ROVNER, L. M.
Effect of accelerations on the thiamine-S/35 distribution in the organism of white mice A73-20977

Effect of accelerations on thiamine-S-35 distribution in the bodies of white mice B73-16044

ROZHANOV, Iu. N.
Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Hock A73-21135

RUTTERJANS, H.
NMR spectroscopic and calorimetric investigation of ribonuclease A and T1 [BMVG-PBWT-72-7] B73-16071

Calorimetric investigation of enzymes. Thermodynamic parameter determination of the interaction between ribonuclease T1 inhibitors and substrates [BMVG-PBWT-72-12] B73-16073

Nuclear resonance investigation of enzymes. PMR spectra of ribonuclease inhibitor complexes [BMVG-PBWT-72-13] B73-16074

RUNG, G. E.
Effects of high mountain climbing on the human organism A73-20991

Characteristics of the effect of high mountain alpinism exercises on the human body B73-16058

RUTTERFRAZ, J.
Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem A73-21575

RYAN-PLATT, R.
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. A73-19932

S

SABIN, C. H.
A urine volume measurement system [NASA-CR-128726] B73-16095

PERSONAL AUTHOR INDEX

SLIBBY, D. H.

- SADERKOV, M. KH.
Mediator systems and respiratory function during an acute lethal loss of blood. A73-19645
- SALAZKIN, V. N.
Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322
- SALTIN, B.
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- SAPLINSKAS, I. S.
Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress A73-19643
- SARUTA, T.
Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. A73-21503
- SAUBERT, C. W.
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- SAVILOV, A. A.
Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability A73-20988
- Effect of a gas mixture with an increased oxygen and carbon dioxide content on man's orthostatic tolerance N73-16055
- SAVINA, E. A.
Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation A73-20981
- SAVINA, Y. A.
Morphological changes in the testes of dogs accompanying chronic and combined gamma irradiation N73-16048
- SCHACHTER, J.
The NASA-USPHS health evaluation and enhancement program N73-17091
- SCHALL, D. W.
Automation of the problem oriented medical record N73-17087
- SCHEEL, L. D.
The toxicity of pyrolysis products from a chlorotrifluoroethylene-ethylene copolymer (Halar resin) [AD-751436] N73-16080
- SCHENID-SCHOENBEIN, H.
Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta. A73-21199
- SCHMIDT, H. J.
Human receptive field characteristics - Probe analysis of stabilized images. A73-20252
- SCHOEBE, K.
Antidotes for alkyl phosphate poisoning: Structure-effect relations in vivo and in vitro [BMVG-FBWT-72-8] N73-16072
- SCHREIBER, G.
Skin protection against high toxic phosphoric acid esters [BMVG-FBWT-72-15] N73-16076
- SCHREIBER, H. B.
Predictive modeling of altitude decompression sickness in humans [NASA-CR-114550] N73-16066
- SCHUSTER, B.
Experiences with physical conditioning programs in middle-aged men N73-17051
- The coronary patient in industry N73-17084
- SEBBOWICH, F. L.
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- SESSLER, A. D.
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. A73-21505
- SHAPOVALOV, A. I.
Evolution of the neuron systems of suprasegmental motor control /Review/ A73-20001
- SHAWITZ, B. A.
Effects of monomethylhydrazine on blood and cerebrospinal fluid glucose in anesthetized monkeys [AD-751232] N73-16092
- SHEPHERD, B. E.
Effect of training on enzyme activity and fiber composition of human skeletal muscle. A73-21508
- SHERB, A. E.
Plastic materials for eye protection from lasers [AD-752594] N73-17127
- SHICHI, H.
Modified rhodopsin in the pigment epithelium. A73-20263
- SHIKINA, M. I.
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984
- Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
- SHIMKOVICH, M. V.
Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis. A73-19151
- SHIPPI, D. J.
Seat reaction direction in an animal centrifuge. A73-19478
- SHITZER, A.
Thermal protective garment using independent regional control of coolant temperature. A73-19481
- SHMELEV, A. M.
Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia A73-21322
- SHUDEL', M. S.
Application of the method of polarization ultraviolet fluorescence microscopy to study giant muscle fibers *Balanus rostratus* Hock A73-21135
- SIEWERT, R. D.
A method for defining down-wind evacuation areas for transportation accidents involving toxic propellant spills [NASA-TM-X-68188] N73-16097
- SIMON, P.
Solar flares and the terrestrial atmosphere A73-19210
- SINGER, B.
Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem A73-21575
- SIBIAK, IU. B.
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984
- SIBIAK, Y. Y.
Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
- SKIDMORE, B.
Conceptual design study for a teleoperator visual system, phase 1 [NASA-CR-124059] N73-17117
- SKOBELEV, I. M.
Liquid flow in a pipe with a deformable wall and valves A73-21375
- SLIBBY, D. H.
Hazards from high intensity lamps and arcs N73-17071

SMITH, D. P.

PERSONAL AUTHOR INDEX

- New standards for ultraviolet radiation N73-17094
SMITH, D. P.
Color naming and hue discrimination in congenital tritanopia and tritanomaly. A73-20251
SMITH, J. R.
Quantitative analysis of the physiological condition and level of alertness of man in an isolated environment [AD-751272] N73-16105
SMITH, E. J.
Empirical reduction in potential user population as the result of imposed multivariate anthropometric limits [AD-752032] N73-17124
SOBEK, B. E.
Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography. A73-21801
SPANGLER, R. D.
A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man. A73-20369
SPODICK, D. H.
The influence of recording speed on apexcardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects. A73-19932
SPRAUL, J. H.
Medical automation system at the Marshall Space Flight Center N73-17068
SRIRAM, S.
The role of colour perception and 'pattern' recognition in stereopsis. A73-20266
STABELL, B.
Chromatic rod vision. IX - A theoretical survey. A73-20261
STABELL, U.
Chromatic rod vision. IX - A theoretical survey. A73-20261
STANLEY, E.
Experiences with physical conditioning programs in middle-aged men N73-17051
STEINBERG, R.
Linearity of the horizontal component of the electro-oculogram. A73-19125
A high yield neutron target for cancer therapy [NASA-TM-X-68179] N73-16067
STEREBOHM, C. E.
Visual sensitivity in the presence of alternating monochromatic fields of light. A73-21567
STOLBOV, V. F.
Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products A73-20984
Radiation oxidation of water impurities in moisture-containing products of man's vital functions N73-16051
STOVIN, P. G. I.
Hemophoretic and histochemical investigation on human right atrial and mitral papillary muscle. A73-21215
STRAND, J. C.
Changes in total plasma content of electrolytes and proteins with maximal exercise. A73-21507
STRASSEB, H.
Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modularity. A73-20388
STROGANOVA, E. A.
Effect of lasting hypodynamia on rat biology N73-20983
STROGANOVA, Y. A.
Effect of prolonged hypodynamic on rat biology N73-16050
STUBBS, S. E.
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. A73-21505
SULLIVAN, D. J.
Training effectiveness evaluation of naval training devices. Part 1: A study of the effectiveness of a carrier air traffic control center training device [AD-751556] N73-16101
SUVOLOV, P. M.
Analysis of some mechanisms of human stability to decompression of the lower portion of the body A73-20987
Analysis of some mechanisms of man's tolerance to lower body decompression N73-16054
TAKAHAMA, K.
Analysis of contrast and assimilation effects on the basis of receptive field models. A73-20812
TAYLOR, D. E. M.
Pattern of blood flow within the heart - A stable system. A73-21214
TAYLOR, P.
The motivating influence of retest and repeated dietary counseling on cholesterol reduction N73-17081
TAZETDINOV, I. G.
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990
Use of sodium hydrocarbonate as a means for treating and preventing motion sickness N73-16057
TEMPLETON, G. H.
Method for measuring the contractions of small hearts in organ culture. A73-21218
THEOLOGUS, G. C.
Development of a standardized battery of performance tests for the assessment of noise stress effects [NASA-CR-2149] N73-17102
THOMAS, A. A.
Effects of methylene chloride exposure on the spontaneous activity of mice [AD-751435] N73-16082
THOMPSON, B. A.
Training effectiveness evaluation of naval training devices. Part 1: A study of the effectiveness of a carrier air traffic control center training device [AD-751556] N73-16101
THOMPSON, F. D.
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms. A73-19124
THORNE, R. G.
Pilot workload: A conceptual model N73-17010
THURSBY, W. R., JR.
Human factors evaluation of laser protective visors [AD-751470] N73-16102
TIKHONOV, M. A.
Respiration mechanics during weightlessness simulation in an immersion medium A73-20986
Mechanics of respiration during simulation of weightlessness in an immersion medium N73-16053
TKACHEVKO, N. N.
Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropic hormone excretion levels at various stages of ontogenesis. A73-21319
TOLOS, W. P.
The toxicity of pyrolysis products from a chlorotrifluoroethyl-ethylene-ethylene copolymer (Halar resin) [AD-751436] N73-16080

PERSONAL AUTHOR INDEX

WANDS, R. C.

- TOMLINSON, G. A.**
Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria. A73-19500
- TOMESK, I.**
Normally expected aberrations in the 8-hour dynamic EKG N73-17066
- TOTSKII, V. N.**
Effect of accelerations on the thiamine-S-35 distribution in the organism of white mice A73-20977
- TOTSKII, V. N.**
Effect of accelerations on thiamine-S-35 distribution in the bodies of white mice N73-16044
- TOWNSEND, F. S.**
Stability of human sera collected for clinical chemistry determinations N73-17053
- Laboratory aspects of blood lipids N73-17073
- Some pitfalls of urine analysis N73-17089
- TOWNSEND, J. C.**
Leave taking and overtime behavior as related to demographic, health, and job variables N73-17055
- Normally expected aberrations in the 8-hour dynamic EKG N73-17066
- The motivating influence of retest and repeated dietary counseling on cholesterol reduction N73-17081
- TREEZEK, G. J.**
Predictions of the dynamic response of the lung. A73-19477
- TROSHIKHIN, G. V.**
Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere A73-20979
- Heat regulation reactions in rats in a hypoxic atmosphere with nitrogen and helium dilution N73-16046
- TSEITLIN, L. A.**
Transglucosidase activity of heart-muscle per-glucohydrolase A73-21136
- TUCKER, R. J.**
Plastic materials for eye protection from lasers [AD-752594] N73-17127
- TUMAKOVA, B. M.**
Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold A73-21323
- TURNEY, S. Z.**
Heated Fleisch pneumotachometer - A calibration procedure. A73-21509
- V
- VALBENTIBUZZI, M. B.**
The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms. A73-19124
- VALVERDE, H. H.**
Evaluation of a device to train forward air controllers to communicate target locations [AD-751292] N73-16103
- VAN BEAUMONT, W.**
Changes in total plasma content of electrolytes and proteins with maximal exercise. A73-21507
- VANBEAUMONT, W.**
Objective evaluation of cutaneous thermal sensitivity [NASA-CR-114564] N73-17113
- VANSTEE, B. W.**
Special aspects of aviation occupational medicine. Cardiovascular and nervous system effects of bromotrifluoromethane [AGARD-B-599] B73-17106
- VARTANIAN, G. A.**
Ontogenesis of cerebrospinal reflex activity A73-20366
- VASILENKO, D. A.**
Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculus of the cat spinal cord A73-20002
- VIDYASAGAR, T. R.**
The role of colour perception and 'pattern' recognition in stereopsis. A73-20266
- VIGHATI, L.**
The toxicity of pyrolysis products from a chlorotrifluoroethyl-ethylene-ethylene copolymer (Balair resin) [AD-751436] N73-16080
- VILLAFAMA, C.**
The value of continued followup in a preventive medicine program N73-17072
- The motivating influence of retest and repeated dietary counseling on cholesterol reduction N73-17081
- The management of chronic disease: A study of employee morbidity and mortality at the NASA, Goddard Space Flight Center, 1966 - 1971 N73-17086
- VINJE, E. W.**
Comparison of human operator critical tracking task performance with aural and visual displays. A73-21667
- VIEHMANN, Y. P.**
Spin-labeling studies on the membrane of a facultative thermophilic bacillus. A73-20027
- WISSEER, K. R.**
Analysis of indicator distribution in the determination of cardiac output by thermal dilution. A73-21216
- Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter. A73-21217
- VLIERIS, A. C. A. P.**
Analysis of indicator distribution in the determination of cardiac output by thermal dilution. A73-21216
- Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter. A73-21217
- VOGEL, J. A.**
Central, femoral, and brachial circulation during exercise in hypoxia. A73-21506
- VOLOSEVICH, B. M.**
Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness A73-20990
- Use of sodium hydrocarbonate as a means for treating and preventing motion sickness N73-16057
- VO SEELEN, W.**
Information processing in the visual system. A73-20374
- W
- WADE, J. D.**
Pattern of blood flow within the heart - A stable system. A73-21214
- WAECHTER, A.**
Pulmonary respiration and acid-base state in hibernating marmots and hamsters. A73-21613
- WALDBISEN, L. B.**
Individual differences as a function of four choice informational load and s-r compatibility [AD-752073] N73-17115
- WANDS, R. C.**
Guides for short-term exposures of the public to air pollutants [AD-751438] N73-16084
- Basis for establishing guides for short term exposure of the public to air pollutants [AD-751437] N73-16088

WANG, R. C.

PERSONAL AUTHOR INDEX

- The relationship of NASA occupational medicine and environmental health with the Advisory Center on Toxicology
[NASA-CASE-LAB-11074-1] N73-16096
- WANG, R. C.
A model to predict respiration from VCG measurements.
A73-20578
- WARDEN, J. A.
Effects of methylene chloride exposure on the spontaneous activity of mice [AD-751435] N73-16082
- WARTZ, R. S.
The toxicology of some commercial fluorocarbons [AD-751429] N73-16079
- WARRE-JANVILLE, B.
Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant A73-21540
- WASSERMAN, K.
On-line computer analysis and breath-by-breath graphical display of exercise function tests.
A73-21511
- WEBSTER, J. G.
Noninvasive measurement of central venous pressure [NASA-CR-130348] N73-16039
- WEINSTEIN, E. S.
Dichloromethane hepatotoxicity in mice with continuous and intermittent inhalation exposures [AD-751434] N73-16061
- WEISS, M. S.
Non-Gaussian properties of the EEG during sleep.
A73-21465
- WELLS, B. E.
Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta.
A73-21199
- WEPPPE, T.
Pilot performance during a simulated standard instrument procedure turn with and without a predictor display [NASA-TM-X-62201] N73-17118
- WESEZEL, B. G.
Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem
A73-21575
- WEBER, S.
A bibliography of wildlife movements and tracking systems [NASA-CR-130380] N73-16040
- WESTBROOK, P. R.
Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man.
A73-21505
- WEHATON, G. B.
Development of a standardized battery of performance tests for the assessment of noise stress effects [NASA-CR-2149] N73-17102
- WEHIPP, B. J.
On-line computer analysis and breath-by-breath graphical display of exercise function tests.
A73-21511
- WHITE, B.
Review of a series of proctosigmoidoscopies done at Wallops Station, Virginia
N73-17061
- A case of near fatal ammonia gas poisoning
N73-17088
- WEITZLE, P.
The brightness of coloured flashes on backgrounds of various colours and luminances.
A73-21565
- WILDEBERTHAL, K.
Method for measuring the contractions of small hearts in organ culture.
A73-21218
- WILKINS, J. B.
Cinemicrographic study of the development of subsurface colonies of *Staphylococcus aureus* in soft agar.
A73-21828
- Apparatus for microbiological sampling [NASA-CASE-LAB-11069-1] N73-16061
- Automatic inoculating apparatus [NASA-CASE-LAB-11074-1] N73-16096
- Bacterial identification using light scattering measurements: A preliminary report N73-17090
- WILLIAMS, E. W.
Human endocrine-metabolic responses to graded oxygen pressures.
A73-19479
- WILLIAMSON, S. M.
Occupational medical trends in the 70's from industrial view
N73-17077
- WILSON, B. V.
The effect of handedness on a tracking task [RAB-TR-72117] N73-16098
- WILSON, T. A.
A model for the elastic properties of the lung and their effect on expiratory flow.
A73-21502
- WINANS, L., JR.
A study of psychrophilic organisms isolated from the manufacture and assembly areas of spacecraft to be used in the Viking mission [NASA-CR-130009] N73-16059
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An operating environmental health program
N73-17093
- WISE, G.
Linearity of the horizontal component of the electro-oculogram.
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Human operators and automatic adaptive controllers - A comparative study on a particular control task.
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- WOLBURG, I.
Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise
A73-20034
- WOODS, B. J.
Evaluation of a device to train forward air controllers to communicate target locations [AD-751292] N73-16103
- WOOTEN, F. T.
Applications of aerospace technology in biology and medicine [NASA-CR-130544] N73-17047
- WORTMANN, W.
Stress recovery of human tendons after relief - Mechanical recovery
A73-20033
- WRIGHT, P. E.
Apollo 11 impact on the occupational medicine program, NASA Manned Spacecraft Center
N73-17049
- WYDEVEN, T.
Synthesis of reverse osmosis membranes by plasma polymerization of allylamine.
A73-19169
- Y
- YCAS, M.
De novo origin of periodic proteins.
A73-19219
- YERBE, C.
Evoked potential correlates of expected stimulus intensity.
A73-21225
- YORK, H. C.
Monocular and binocular aspects of apparent movement.
A73-20262
- Z
- ZAKHAR, IU. IA.
Ontogenesis of cerebrospinal reflex activity
A73-20366
- ZASLAVSKAYA, R. N.
Diurnal rhythm oscillations of fat metabolism indices in healthy young men
A73-19646

PERSONAL AUTHOR INDEX

ZIMIN, IU. I.

ZHIROVSKII, A. G.

Mathematical analysis of the responses of the
human respiratory system to hypoxia and
hypercapnia

A73-21322

ZIJLSTRA, W. G.

Analysis of indicator distribution in the
determination of cardiac output by thermal
dilution.

A73-21216

Choice of detection site for the determination of
cardiac output by thermal dilution - The
injection-thermistor-catheter.

A73-21217

ZIMIN, IU. I.

Role of adrenalin and alpha-receptor deactivation
in reactions of hemopoietic organs to stress

A73-19644

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